seeds of hope in the modern world

BARRY ULANOV

with illustrations

The purpose of this stimulating and thoughtful book is to show that the discoveries of certain men of our time—scientists, artists and scholars—have brought us to a new recognition of Reality. Barry Ulanov reminds us of those ways in which modern man is separated from the world, from himself and from God; yet it is his contention that the subjects and objects of meditation, far from having shrunk in our time, have been immeasurably expanded.

Describing the microscopic and macroscopic view of the universe unveiled by modern scientists, the author says: "The great meditations of our time may well be those of the physicist speculating on the elusiveness of matter or the biologist wondering about the mystery concealed in the form of animals." He discusses too

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seeds of hope in the modern world

For my seeds of hope:
Anne, Nicholas, and Katherine

seeds of hope in the modern world

BARRY ULANOV

As snow in summer, and rain in harvest,
so glory is not seemly for a fool.
—*Proverbs 26:1*

P. J. Kenedy & Sons · New York 8

Library of Congress Catalog Card Number: 62–10910
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PRINTED IN THE UNITED STATES OF AMERICA

contents

Introduction ix

I THE DILEMMA

1 *In fear and dread* 3

Psychological maladjustment 6
Sociological disenchantment 9
The process-haunted mind 12

2 *Process in the arts* 14

Painting 14
Music and the dance 17
Architecture 19
Poetry 21
Drama 23

3 *The novelist-philosophers* 25

Marcel Proust 25
Thomas Mann 26
James Joyce 29
Virginia Woolf 31
Franz Kafka 34

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II THE RESPONSE OF SCIENCE

4 *Man before nature* 45

The terrors of nature and the cultural divide 45
The realities of nature 48
The scientist's role 49
Two other worlds: the macroscopic and the microscopic 55
The language of uncertainty 59

5 *Physics and the mysteries* 62

The range and relevance of complementarity 64
The limitations of scientific knowledge 68
Two views of reality: determinism and indeterminism 74
The extraordinary powers of ordinary men 76

6 *The world of form* 78

The sense of form 78
The science of form 82
The contemplation of nature 84
The illative sense and science 98

7 *From the surface to the depths* 102

The place of mystery 104
The place of religion 107
Science and apologetics 109
Science and religion 113

III THE RESPONSE OF ART

8 *Art and sanctity* 119

Art and abstraction 121
Georges Seurat 123
Paul Cézanne 124

The reality of the object 125
Vincent Van Gogh 126
Kandinsky, Klee and others 128
A philosophy of the object 129
A sense of the present 132
A sense of presence 134
The religious object 136
Fernand Léger 136
Henri Matisse 137
Le Corbusier and Rouault 137
Alfred Manessier 139

9 *Evaluating abstraction* 141

10 *The composer and abstraction* 149

Igor Stravinsky 154
The Sunday composers of Paris 156
Olivier Messiaen 157

11 *The art of verbal abstraction* 160

The word 163
Yeats, Valéry and obscurity 165
Tradition and T. S. Eliot 166
Pound, Pisa and mystery 168

12 *The art of the concrete* 170

IV THE RESPONSE OF LOVE

13 *The world within* 181

14 *The act of love* 187

Conclusion 192

Notes 202

Index 208

acknowledgements

IT IS a pleasure to acknowledge the importance of this book of conversations held over many years with friends and colleagues, painters, musicians, scholars, and scientists. There have been too many to list all who have left their mark on my thought, but several contributions require special mention. In the course of long talks in New York and Vermont, Mr. Alfred Pietrasanta of IBM, Professor Amedeo d' Adamo of the College of Medicine of Seton Hall University, and Professor Joseph Budnick of Fordham University have done much to influence my thinking about science and scientists. I am particularly grateful to Professor Budnick for his close reading of Part II of this book in manuscript and for his many helpful comments, as I am also to Miss Julie Kernan for her always apposite and admirable suggestions. Needless to say, I am solely responsible for the final form of the book.

Acknowledgement is gratefully made to the following publishers for permission to include quotations from books published by them: Cambridge University Press, London and New York, for passages from Agnes Arber, *The Mind and the Eye: A Study of the Biologist's Viewpoint* (1954), and from R. B. Braithwaite, *Scientific Explanation* (1955); Doubleday & Company, Inc., New York, for passages from D. W. Sciama, *The Unity of the Universe* (1961), and from Igor Stravinsky and Robert Craft, *Memories and Commentaries* (1960); Faber and Faber, London, for lines from Louis MacNeice's "Snow," from his *Collected Poems* (1949), also for passages from Eric Portmann, *Animal Forms and Patterns* (1942), and Friedrich Reinhardt, A. G., Basel, for five figures from the same book; Harcourt, Brace & World, Inc., New York, for lines from T. S. Eliot, *Four Quartets* (1943); Harper & Brothers, New York, for passages from Pierre Teilhard de Chardin, *The Phenomenon of Man* (1959), and from Werner Heisenberg, *Physics and Philosophy: The Revolution in Modern Science* (1958); New Directions, New York, for permission to reprint lines from *The Cantos*, copyright © 1934, 1937, 1940, 1958, by Ezra Pound; W. W. Norton & Co., Inc., New York, for a passage from J. H. Van den Berg, *The Changing Nature of Man* (1961); Pantheon Books, Inc., New York, for passages from Louis de Broglie, *Physics and Microphysics* (1954); University of North Carolina Press, Chapel Hill, for a passage from Edmund W. Sinnott, *Cell and Psyche: The Biology of Purpose* (1950); George Wisenborn, Inc., for excerpts from *Dada Painters and Poets*, edited by Robert Motherwell (1951); Yale University Press, New Haven, for a passage from Max Scheler, *The Nature of Sympathy* (1954).

The author is also grateful to those who supplied and gave permission for the use of the picture material used to illustrate examples of modern art, and particularly to The Museum of Modern Art, New York, and The Solomon R. Guggenheim Museum, New York.

introduction

WE live in an age of specialization, we are told again and again. Ours is also, we need to be reminded and at least as often, an age of separation. Modern man is separated from his world, from himself, from God.

The number of volumes that describe the several separations of modern man or that prescribe for them is very large. They reach back for centuries, these sad chronicles. Erasmus was turning over in his richly ironic mind man's separation from himself when he wrote *The Praise of Folly*. Thomas More was lamenting the rupture between man and his world when he showed what a joy could be made of life on earth just by the light of the reason alone, unaided by revelation, in the *Utopia*. Pascal was marking out with a geometrician's precision of line the separation of man from God in those extraordinary fragmentary soliloquies, the *Pensées*.

In our time, description has to some extent given way to prescription. Never have there been so many self-help books. And for good reason. Many modern men refuse to accept their separation from Creator and creation as a *fait accompli*. Sometimes, for example, they rush to beg support from the psychoanalyst. Some-

times they seek light from the East. Unfortunately, they do not often go where the Eastern philosopher and the analyst and the self-help books all send them: back to themselves and their world. They are so absorbed in the methods of psychoanalysis, in the exercises of the East, in the machinery of self-help, that they rarely come to know themselves or their world, much less to help either. Like so many in our time—college students, organization men, bureaucrats, just to take the most obvious examples—they have become so caught up in process, the way they do things, that they have lost sight of purpose, why they do them. And so the separation widens.

One would expect Christians to know better and to do better. They, at least, are not so caught up in the means of salvation that they have forgotten their purpose. They have their own spiritual exercises, it is true—their daily prayers and special devotions—but they recognize them as means, not as ends, and they pursue them only to end pursuit, to find rest. But they too are often separated from creature and creation, and hence from Creator. Their separation is the result of suspicion. Christians have long sniffed at the world and found its odors insupportable. Of course, they are not entirely wrong. The world in its most worldly aspects can be unbearable. But if one altogether rejects the world, one will soon find oneself, as a result, living at such a remove from his own time and from his neighbor that he barely knows its particular way of speaking, its particular way of thinking, its very special way of meditation and contemplation.

Meditation and contemplation in our time, like language and thought, do not often follow familiar paths. They could not, for the remarkable meditative minds of our time have looked elsewhere than to the familiar for their meditations. Or rather, they have looked through the familiar to the unfamiliar, have looked with such intensity and ingenuity and patience at the common-

place that they have discovered once again, as the Greek and Latin Fathers and the Renaissance humanists did before them, how very uncommon it is. And so the great meditations of our time may well be those of the physicist speculating on the elusiveness of matter or the biologist wondering about the inner mystery concealed in the outer forms of animals, or the painter and the composer and the poet stripping their arts to their essential units in order to discover the ineffability of sight and sound and rhythm. For the fact is that the ways and means, the subjects and objects of meditation and contemplation, far from having shrunk in our time, have been expanded immeasurably.

This book is an attempt to suggest some of the ways in which some of the men of our time have brought us closer to mystery by their meditations. The particular men treated here are scientists and scholars and artists. They do not by any means exhaust either the kinds or the number of men who have contemplated the modern world with particular profit for modern man. But they are, I think, examples of an inspired way of dealing with the tortures of a process-haunted world, even though some of them have themselves contributed to those tortures. They also exemplify, handsomely, a sense of purpose, which in their work seems to have replaced that excessive concern with process which I have diagnosed as one of the central ills of the modern era.

I have certainly made no effort to minimize the tortures of modern life, as the first section of the book will make abundantly clear. Neither have I tried to restrain my enthusiasm for the assuagements and antidotes offered by the exemplary artists and scientists and scholars. For what they offer—or more exactly, what is offered through them—is reconciliation of man to himself and to his world and to life itself, reconciliation at a point at which separation threatens to become divorce. But this is not to say that it is only reconciliation at the point of a gun—or a bomb.

There is something more positive here than that: There is mystery and there are insights into it, so large and majestic and protracted a series of insights, that one may come to believe (as I have suggested in my conclusion) that the tortures of process were designed by Providence in order to provide the contrary assuagements. Thus the meaning of the quotation from the Book of Proverbs on the Title Page: "As snow in summer, and rain in harvest, so glory is not seemly for a fool." The most startling reversal of the way the world usually functions, even of the natural order of things, may not bring disaster, but glory. When so many of our traditional certainties have been destroyed, and the unexpected or disastrous confronts us everywhere, it is foolish to bemoan our fate. If we are wise, we will look for meaning and value even in the new, the unfamiliar, the frightening, the "unseemly." Thus the play on words which is in the title of this book, SEEDS OF HOPE IN THE MODERN WORLD. The modern world not only provides us with occasions of hope, it is in itself worthy of our hope. One can still believe, after looking at the terrors as well as the splendors of the modern world, the splendors as well as the terrors, that God sees all the things that he has made, and that they are good.

PART I

THE DILEMMA

1

in fear and dread

MODERN man is afraid of himself. He knows he has the power to destroy his world. He fears he may destroy himself. What he fears is not simply physical or psychological destruction but the annihilation of the human spirit. He knows more or less where he is, but not what or who he is. He can identify the spot on this earth, or if he lives long enough the place on the neighboring planet, from which he may plunge to his doom. He cannot quite identify himself or, what is even more worrisome, his species. The one factor that was for centuries the safe, the certain one, the known from which one journeyed to the unknown, has become for man the altogether uncertain, the insecure, the very definition of the unknown: himself.

In 1931, Karl Jaspers writing about *Man in the Modern Age* could say with accuracy, "Our representation of the outer world tends to discourage us. We have a pessimistic outlook; we incline to renounce action." He could also set against the pessimism its opposite: "In other cases, however, despite our gloomy picture of the world in general, we preserve an indolently optimistic consciousness of our own personal joy in life and are satisfied with our contemplation of the substantial—for such an attitude

is to-day common enough." [1] Thirty years later, we are still discouraged by our picture of the world around us. But an optimistic awareness of joy in life by the individual, even one that flirts slothfully with the fringes of daydream, is very very rare, and action, far from being renounced, has become the means by which most people woo at least the notion of joy and stamp out their fear of the unknown—that is themselves.

It is true that action, in the second half of the twentieth century, is something less than the kind of urge to self-fulfillment of which Jaspers was speaking. Action is today often little more than the play period that precedes narcosis, the wearing down of the muscles, the blood, and the nerves so that one can slip comfortably and gratefully into the accustomed passivity by the television set with which the most modern of modern men crowns his days. Action is the antimetaphysical gamesmanship, the series of moves on the field, in the gymnasium, in a car, in a boat, in a plane by which one obliterates the urge to meditate. The ploys are not always successful. Meditation will out. It need not emerge as a systematic and fruitful pondering on the problems of being, however; it can be translated into brooding, which is still a form of meditation, but hardly a systematic one, and one that is much too much characterized by resentment to be fruitful. Finally, then, brooding comes to be identified with meditation, not simply as the debased form of it which it is, but as the real thing, and the common urge of human beings to ponder their destiny is seen and heard to be nothing more than an elaborate whine and hence dismissed as a foolish dissipation of energies which could be better employed in fun and games.

Under such circumstances joy is not exactly unconfined. The nagging voice whines on, no matter how frequently or how forcefully subdued. Extinction, temporary or permanent, beckons, but contemplation of the approaching débâcle also makes

its inviting gestures. Pascal's axiom remains constant—Man is great inasmuch as he knows that he is miserable; a tree does not know that it is miserable—and not without comfort, since misery thus judged is an index of greatness, and one thing man can always be sure of in this time is misery.

The voices one hears assuring modern man of his misery do not, however, always convince him that he is great. Twentieth-century sayers, whether yea or nay, tend to make man small in his misery. One group offers him a smallness of belief, the opportunity to hold on to some attenuated religious doctrine which bears a fine bright modern name but does not really sustain much faith. The other holds out to him a largeness of disbelief, the chance not to hold on to anything at all, so that he can find a special solace in the courage he will soon remark in his own splendid hands-off fearlessness. The first group inclines to a feeling of contentment in its own wisdom. It has noted with a certain unhappiness the motes and beams in other eyes and rests at some ease in finding none in its own, for having pruned religion of its clutter of dead branches, this group has really gotten down to essentials. The second group has an even greater assurance of its wisdom. It has discarded everything that tastes of faith, faith in a supreme being, faith in the world, faith in man, faith in itself. At its edges, this group is held down by a few drag-at-the-heels nineteenth-century positivists who insist upon the validity of facts and phenomena, at least as momentary counters for sense experience. But on the whole, the disbelievers stay far from creeds, even the vague and vacillating beliefs of the latter-day positivisms that see only a limited and temporary value in observations made by the senses.

Sad to say, this last group can no longer be called the gay disbelievers, as once, and not so long ago, it could. It has lost the sheer joy of discarding for discarding's sake, the ebullience

verging on ecstasy that accompanied the rejection of one hackneyed creedal vocabulary after another. Its temper has become the distemper of the times, cynical, disaffected, ill at ease with almost everything and everybody, in spite of its large certainties about its own uncertainties. Uncertainty breeds neither comfort nor joy for long.

Psychological maladjustment

It is perhaps inaccurate to speak of true disbelievers as altogether without faith, for they recognize as at least useful and at best quite reliable the findings and plottings, the conjectures and contrivances of modern science. From these discoveries and deliberations, and especially from the machinery by which both are made, they have constructed a way of life and a texture of thought the canons of which have remained remarkably fixed and stable over the decades, in spite of the principle of uncertainty upon which the whole value system is founded. The tone is set by psychology, or perhaps it would be fairer to say by psychoanalysis, for the prevailing vocabulary is Freudian.

The true disbeliever's household is run by the entries in a life calendar which starts with the incestuous attachments of son to mother and daughter to father, which Freud forever colored with the violent language of the Oedipus drama, and ends with the death wish. The more learned in the master's idiom, those who have read his casebooks in depth and in detail, tend to a typology of the anal and the oral. All, at no matter what level of accomplishment, listen alertly for every verbal slip, no matter how innocent-appearing, and examine intently every action, no matter how guileless to the uninstructed eye, for all recognize that innocence is simply a mask for frustration and guilelessness often

nothing but an enormous and ingenious machinery of repression. We are almost all of us monsters of evasion, running recklessly from our true selves, the ones we know (or do not know) in dreams. Like Minotaur or the mother of the bull-man, Pasiphaë, we are almost all of us the victims of our own sexuality. If we face ourselves with candor, we must acknowledge the Jack the Ripper within, a gross enough inhabitant of the flesh. If we do not, we must yield to something far worse, the festering products of repression and frustration, every manner of psychological delusion and pathological debility, ranging from tics to split personalities. In any case, we are monsters.

There are softer systems of psychological value upon which a sturdy antimetaphysics can be erected, softer in the sense that they are more tender of human feelings and do not make such a show of tough-minded objectivity. One can turn, for example, to the individual psychology of Alfred Adler for a typology full of cross-grainings and solicitous of every finding that will mark cases as unique. Even Adler's diagnosis of the inferiority complex is not as a disease but as a basis for striving for progress. Nonetheless, in his works, as in those of Freud and Jung and Rank and Fenichel and all the others who have made psychology into one of the ruling disciplines of twentieth-century thought, the dominant roles are those of the neurotic personality and mental disorder. As a result of their labors and those of their many industrious supporters and successors, the term "normal" has been retired from general use (except to designate a school for the training of teachers or good eyesight or, in geometry, a special kind of perpendicular line) and with it the patently outmoded underlying concept of a general range of behavior to which all people could aspire and which most could achieve.

With an entertaining disregard for the meaning of words, it has become a rule of thought as of speech that the abnormal is

normal. The Quaker adage, Everyone is crazy except thee and me and even thee is a little crazy, has become the commonplace attitude of the common man, as the characters of the casebooks and learned-journal articles of the psychiatrists have filtered down into the sorrowful psychoneurotics of television and film drama, each apparently (but only apparently) the apogee of inhuman mutation and human misery.

If everyone is crazy, then of course no one is, or at least the categorical distinction has been robbed of its identifying qualities. Instead of the differences between sanity and insanity which the old and ill-informed alienist looked for, the modern psychiatrist and his army of lay assistants—the public—search for degrees of the neurotic and the psychotic. Nobody is altogether sound psychologically. The best of us are at least weak-jointed. The worst, disturbed by the privations of an overbearing superego, or cursed with an unfriendly environment, or otherwise victimized, are apt to create disturbances. All, the least and the most disturbing, the least and the most disturbed, all are ill at ease in society. Indeed, it may be said of all that they are maladjusted, one of the more felicitous euphemisms for describing what used to be called the normal state.

The recognition of the widespread incidence of maladjustment and the near impossibility of achieving adjustment have resulted in another of the attitudes early taken up by the disbelievers and broadly disseminated by them: tolerance. The true disbeliever is not, like the man of small belief, inclined to see dust only on other people. Motes are universal. He too, the fearless man of no creed, is maladjusted. How then can he censure his fellow men for their maladjustments? One touch of perversion makes the whole world kin. So in a world in which any one of us under stress may at any moment collapse and turn psychotic, value judgments have no particular meaning. To say of an action that

it is noble or ignoble or of a man that he is a success or a failure is to say nothing much at all. To make moral judgments is even more foolish, showing only that the man who does so is the continuing victim of an outmoded absolutism. Everything around us points to the fallibility of such judgments, resting as they do on structures for which no science will provide a foundation. Moral criteria like aesthetic standards cannot be made universal. One man's "good" is another's "mediocre" or even "terrible."

But value judgments keep intruding where they do not belong. Singularities of personal taste or weighty biases of dogmatic belief surround large numbers of the words we use. Each of the parts of speech is shaded or tinted by our emotional life. The humblest preposition or least remarkable conjunction may be called upon by a ravaging subconscious to express tempests of depression, storms of joy. Practitioners of the modern science of semantics have demonstrated the layers of meaning sandwiched between words and, what is more important, the vast gulf between intention and communication. We have little enough chance of understanding ourselves. We have almost none of understanding others.

Sociological disenchantment

To the feeling of futility built up by psychologists and semanticists, sociologists have added a considerable depth. They have shown in their analysis of social structures the network of pretenses and pretensions under which most of us lead our fear-strained lives. The quest for status blocks many a man from the enjoyment of the leisure time for which he works so hard. On the golf course, in the bar, at his neighbor's house, in his own backyard, what he wears, whom he talks to, what he says, what

he likes, what he doesn't—all count and count heavily toward making him a junior or a senior executive, a member of the upper middle class or the lower or the middle middle. He must be careful what breakfast cereal he buys, what newspaper he orders, what book or phonograph record he leaves lying casually around his living room or parlor, rumpus room or family room or den. The great manufacturers and their advertising agencies plan the tail fins on their cars and the comedians in their advertisements with this deadly game of status in mind. And the masses of consumers know that they do. General Motors and General Electric and General Foods do not design their products or campaigns without the full awareness and co-operation of the general public. Not only do the trade journals reveal the strategy of industry and of its psychologists, sociologists, and less academic pitchmen, but so do the general magazines and best-selling books which translate the jargon of the specialist into the words of the general vocabulary. It all amounts to an elaborate collusion in the devious, in which all, if not exactly happy to play their parts, are at least ready and able.

The special service of the sociologist to the public at large is to disenchant. If a man settles, however slowly and carefully, and with however much ease, into his place in school, in society, in business or trade or profession, the sociologist will show him, on the basis of a wide sampling, that he is simply following the lead of many others before and alongside him. When he moves to the suburb, it is not because of the intrinsic qualities of the suburb, though these may play a part, but because the general move is to the suburbs. When he moves back, the same reason can be demonstrated to be pivotal, just as it is in the development of the two-car family, the patterns of dating, courtship, and marriage, the dance one does at the senior prom or the country club, the song one sings in the bathtub or even the fact that

one sings in the bathtub. Conformism is the order of our days and nights, and there are countless studies to show how, if not why. Rebellion can be plotted on a curve, delinquency can be found dancing on a graph. Not one adolescent, but millions drop the imprisonment of skirts, pull up haunch-pinching jeans, and paint their eyes black and their mouths white at the same moment. Not one revolt against the humdrum and the commonplace is plotted in one coffeehouse in Bohemia, but thousands of insurrections in hundreds of cafés. Just as the abnormal has become the normal, the unconventional has developed its own conventions. Nonconformists are conformists under the skin.

No man can rest content long under these conditions. He cannot even be content in his discontent. Whatever he does, he is just like everyone else, and when he stops doing *that,* whatever he does instead, even the very opposite, is once again what everybody else is doing. If he is not lonely in the crowd, huddled with millions of others for a kind of security he never finds, well then he is a queer fellow. If he is lonely in the crowd, as any decent study of crowd conditions will show him he must be, then he is a miserable man and almost certainly doomed to remain miserable. If he tries to buy a certain kind of ease, to surround himself with the apparatus of comfort, then he is told he is a materialist and scorned as a very low type of fellow indeed. If he turns from the world of matter to that of spirit, he can quickly be shown to have become a victim either of second-rate minds or of downright frauds. If he finds comfort of any kind in a love of country or devotion to any part of its culture, there will be political scientists of all sorts to demonstrate to him the horrors of nationalism and just as many social philosophers to show him the essential meretriciousness of patriotism of any kind. And cultural anthropologists, ranging in interest and specialization from Polynesia to the Arctic, from the Orient to the jungles of

South America and Africa, will quickly reduce to the level of the provincial and the parochial any assertion of the superiority of Western culture as they recite the achievements of the so-called primitive peoples.

The process-haunted mind

In an effort to get away from the rigors of analysis and the melancholy findings of the analysts, a man may turn to the traditional disciplines of philosophy. He will find himself right back among the analysts. He will discover that in the United States and England, philosophy, like the railroads, has few branches left and that its main line does not go anywhere near where it used to. A few survivors of ancient schools may still be found holding to the problems of being and becoming and even to the antiquated language in which these problems were for so long set, but they are fewer each year and more furtive in their statements.

The fact is that metaphysics is a discredited philosophical discipline and so far from being the queen of the speculative sciences that it once was today can hardly be found anywhere in the realm of American or British philosophy except as a historical oddity, a specimen of how foolishly men once labored to discover and define their own nature, or as the continuing enemy of the true philosophy. The true philosophy, as everyone realizes, is not a philosophy of truth at all but a means for demonstrating that there is no such thing as truth but only statements about it. Philosophy has become an exercise in mathematical logic, at least in the English-speaking world, in which words are systematically reduced to sign and symbol to show how unreliable they really are and to try to find some level at which com-

munication and intention will be trustworthy, no matter how shallow that level must be as a result of the shearing away of the multiplicity of verbal deceptions in which most people still put their trust some of the time.

In France and elsewhere on the Continent, the prevailing texture of philosophical discourse is sociological and literary. Ethical questions very quickly become political ones and political questions become novels and dramas about political men in which philosophers, professional and amateur, examine the failure of philosophy to provide answers to anything. This existentialist exercise is somewhat different from the mathematical one, but it is also suffused with symbols and it is also endlessly analytical as the characters, acting as our surrogates or the writers', plunge on in their dialectical inquiry. They plunge on, but they arrive nowhere. They cannot arrive at a destination, for a destination would break up the game. Accepting a destination would be tantamount to accepting a belief. Philosophy would then have to return to its antiquated procedures and exhausted resources, to ethics as a guide and epistemology as a means and metaphysics as an end. And everything would then be confused by a strong indication that process was not all that was real, and that there was somewhere outside of it a discoverable reality.

2

process in the arts

Painting

FASCINATION with process, concentration on process, immersion in process—that is the nature of contemporary thought, that is the ordinary way of the arts in our time. No matter what the ostensible content of the paintings and music of the twentieth century, their subject matter has almost always been themselves, the way they have been painted or composed, the process of painting or of composing. It started with the impressionist painters and composers, who evoked scenes, composed little vignettes, took their canvas and their sketchbooks and their music paper outdoors with them in order to bring the whole outdoor world back indoors with them, to take bright afternoons on the Seine, glittering nights in the Latin Quarter, walks across the Tuileries and the Luxembourg into the salon and the concert hall. They did just that. It was the way they looked at what they saw, rather than what they were looking at, that gave their paintings special interest. But they are at least as memorable for their musings on canvas and note paper about the process of painting and composing as they are for what they captured in an oil or a water color or a piano prelude, of a bather, a dancer, a rainfall, or the sound of the bells across the fields.

Indeed it is the experiments with light and tonality that continue to hold the viewer or listener who contemplates the work of Monet and Renoir, Manet, Degas, and Pissarro, of Debussy and Reynaldo Hahn, Gabriel Fauré and Henri Duparc, not the fleeting moments by the river and the race track, the dance studio and the cathedral (sunken or above ground), however charming these may be. To a process-centered world, there is nothing less than exhilaration in the great stripes of color with which Manet impales his wife on a sofa or in the minute particles of light bubbling with color into which Seurat divides a scene of boats in the harbor, or of circus performers. Whether we combine the stripes and particles into a broad field of vision by narrowing our eyes and letting everything float hazily into place or by an act of meditation, one way or the other we are involved in the painter's processes, we collaborate with him, we repaint the picture for him. And equally, listening to the whole-tone figurations of the composers, to their open fifths, their full ninths and elevenths and broad arches across the piano uniting distant registers, we are acutely aware not only of the composing but of the playing procedures involved, however much or little we may know of the art of writing for or playing a musical instrument. We may wander in self-induced reverie while listening to a song-setting of Verlaine or Baudelaire or a tonal adventure in Oriental or Spanish effects, stuffing ourselves with billowy nostalgia for people and places we have never seen, but we can never surrender completely to the music, we are too much aware of how it is constructed and how it is being performed.

The awareness of process in the work of the turn-of-the-century artists is not their invention. It certainly can be found as well in their immediate and even in their more distant predecessors. But when one assembles, for academic purposes, the patterns of light and color in the paintings of Turner, Con-

stable or Bonington, or the principles of composition in Poussin and Chardin, or examines the orchestral palette of Berlioz and Wagner, one knows one is doing an exercise. For the first response to Turner's trains or Constable's countryside, to Poussin's white-fleshed antiquity or Chardin's red-tinted apples, to Berlioz' brigands and poets or Wagner's giants and dwarfs is not to an artist's method or manner; it is to his content, a content glimpsed, grasped, and one thinks, understood. Whether one responds with joy or aversion, one responds to the material itself; one surrenders happily or unhappily to the romance of the painting or the music. The cooling distance from which one can see brush strokes as brush strokes and chord progressions as chord progressions is not yet, except for those who are so caught up in the processes of twentieth-century art that they cannot view any art except in terms of process.

It has been so long now that we have been looking at paintings—and advertisements and film and television and theater settings and magazine layouts—in which the painting process has been the subject matter that it may be impossible for many of us ever to look at a painting any other way. Color and texture and line have preoccupied most of us for most of our lifetimes, whether we have been entirely aware of them or not. Our taste in these things does not matter, we have been so long conditioned to them. We have been drowned in the color-drenched canvases of Gauguin and Matisse and Dufy and Vlaminck and Derain. We have almost literally felt the thickness of Van Gogh's paint and Rouault's. We have skipped across the helter-skelter checkerboards or moved airily through the psychological machinery of Klee's drawings. If we have not confronted each of Picasso's styles in his own performances, we have met them in the mirror images of cartoon creatures in humor magazines and television commercials or in the line drawings that accom-

pany stories in the fashion magazines. Mondrian has turned up in Coca-Cola ads and girdle and brassière spreads, holding the line against several kinds of pop. And now the massive calligraphy of the abstract expressionists is being used to compose backgrounds at least for television and often to set a whole musical show in the medium. We are no longer in Venice or Paris, London or New York, the city or the country, for a dance or a sketch; we are on a scaffold, in a puddle of paint, perched on a huge jagged line or leaping over free forms that are a cross between a Rorschach ink blot and an Arp concretion. The subject is process. The scene is process. The method is process.

Music and the dance

Music and the dance have been just as thoroughly concerned with themselves for the past sixty years. The progress of Igor Stravinsky across styles and manners, so much like that of Picasso in his anthological hop across every school of art in our time, is a history of the process-soaked music of this century.

Writing for the ballet at the time of the First World War, Stravinsky was still under the influence of his teacher Rimsky-Korsakov and the French impressionists with whom he worked to provide music for Sergei Diaghilev's Ballets Russes. But even while making nimble syntheses of Russian legend and French modes for Diaghilev, he was experimenting with staccato rhythms, with startling changes of time and noisy summonings of the spirit of primitive ritual that were the musical equivalent of Picasso's use of African masks and sculpture as a foundation for cubist planes. Stravinsky's abrupt turn from the primitive to the hyperdelicate in his next stage, his neoclassical period, was consistent with what he had been doing, at least in its abrupt

break with past processes. The break was not altogether abrupt, however. The staccato rhythms continued to shuttle back and forth across his music, even through rearrangements of Pergolesi and Byzantine psalmody, and they made Tchaikovsky's *Sleeping Beauty* just grotesque enough to satisfy self-consciously anti-sentimental ears.

When Stravinsky turned in the late 1950's to the formulations of the twelve-tone school, and particularly to the work of Anton von Webern, for still another style and manner, he brought together the leading processes of music in this century. It was a little as if Picasso had suddenly turned to the German expressionists for instruction and methodology. Its effect was to call attention to what had happened in music in six decades. All systems had in effect become one system—the system of process, system as matter and manner, process as form and content—and not simply process or system, but that one that most thoroughly calls attention to itself by producing themes and variations in a tightly organized, perfectly controlled mathematical way, starting with the first statement of a theme, which then determines the rest of the musical structure. In case any of this should be missed, every step in the process was detailed, in magazine articles, in record notes, and in book form, in a continuing dialogue between Stravinsky and his amanuensis Robert Craft. To be unaware of the musical process was not only to lack ears but eyes.

In the dance the evolution was essentially the same, with periodic returns to programmatic ballets and mimed glosses and commentaries on poems and stories to vary the ascent to abstraction. But process obtained. Like music, the dance necessarily depends on form for much of its content. The least experimental ballets ever devised, works like *Gisèle* and *Les Sylphides,* are much of the time little more than exercises in the art of the

leap, the turn, and the entrechat, with high points given the corps that can execute its not especially ambitious set of canters and capers tidily and more or less together. What the process-conscious choreographers who followed after the ballet story-tellers did was to concentrate on the imperfections as well as the skills of dancers. Every awkward gesture, every toppling toe, as Mary Wigman demonstrated, could translate a psychological state. Neurosis was just around the femur and over the tibia. George Balanchine, a more dispassionate choreographer than most, isolated human movement into the patterns of Stravinsky's music—and Bach's and Bizet's and Hindemith's and Tchaikovsky's—and made over ballerina and ballerino into a series of endlessly flexible mobiles lacking only the humor of their wire and wood abstract counterparts.

Architecture

One must be aware of process in architecture. Survival of one's buildings depends upon it, but not only survival in the physical sense. If an architect's design is to touch the sensibility of those who use or even just pass by his buildings, form cannot altogether follow function while everything else falls easily into the mechanical patterns of a machine for living. There was a brief period in this century when buildings of all sizes and purposes were dull exercises in plane geometry with all the imaginative power of a cereal box. But architects were not long content with boxmaking. More and more they modeled their buildings plastically, breaking away from the square, the rectangle, and the cube, varying the monotony of their large-scale cellular structures with segments of different sizes and shapes, some of which were openly and unashamedly designed for ornamental purposes.

To begin with, in the development of what is loosely termed

modern architecture, the new architect's working procedures were evidenced by his choice of materials, first iron and steel and glass and then reinforced concrete, and these have again and again in the last century served as signs of the contemporaneity of a building's conception. Then architecture moved in many directions at once: toward a closer identification with its setting; toward a linear expression that was sometimes suggestive of cubist compositions, sometimes organized in cubes and squares and rectangles directly out of the paintings of the Dutch *De Stijl* group; toward a monumentality that took the fullest possible advantage of the structural strengths of modern materials; toward a composing in space that made the personality of the architect and the nature of his art more and more clear to the interested viewer.

Inevitably, architects moved to the most open possible declaration of their principles of process. The skeletons of buildings were exposed. In the design of airplane hangars, exhibition halls and arenas, the steel and concrete ribbing of great barrel vaults was allowed to form its own tracery in a kind of gigantic modern parody of the Gothic ceiling. Curtain walls of aluminum and glass made the construction of a building its central element of design. Process, once again, was exhibited to the eye as subject matter, not only the architect's conception but the engineer's, and not these alone but the manufacturing process itself, as the panels of pressed aluminum or the screens of glass proclaimed the means by which they were molded into shape. For what was being shown now was not simply glass or metal cut and shaped to fit an architect's specifications, but a steel girder or an aluminum strut as it was designed for anybody's and everybody's use. Short of having a blueprint stand in place of a building, the ultimate reduction of architecture to process had been achieved.

Poetry

Concentration on the poetic process by poets began long before the modern era, in the modal constructions of medieval rhetoricians and the elaborate theorizing of Renaissance practitioners. But this process as an end in itself, as the just and proper subject of poetry, would have horrified these men, for all the size and seriousness of their passing commentaries on style and technique.

It was the French symbolists who began the transformation of process from means to end, and especially the apostle of *poésie pure*, Stéphane Mallarmé, and all those who imitated his linguistic experiments. Every literature in the West in this century has concentrated on a poetry which does nothing so much as dwell on the problems of poetry. Poets like Eliot and Yeats and Valéry, like Wallace Stevens and Marianne Moore, like Eugenio Montale and Sergei Yesenin and García Lorca, do not merely write about themselves; they write about themselves writing about themselves. What they hope to communicate, of course, is a good deal more than a few random facts about themselves or even a systematic presentation of their own working methods; they are attempting to illumine the process by which words turn into verse and verse into poetry. Whatever ends they may have in mind—even such a hard-working Christian as Eliot—they have long ago recognized as beyond achievement, or at least beyond satisfactory verbalization. And so they have concentrated on the poetic process itself, filling their poems with the scraps of other poets' work on which they have built their own, making a mosaic of quotation and paraphrase and arcane reference which a reader armed with the rare combination of a patient pedantry and a lightning intuition may be able to sort into patterns of a kind.

Other arts are plumbed restlessly by these poets for some insight into the processes of composition, a discoverable analogy, another witness. Music, as the most form-centered and therefore the most process-concentrated of the arts, stands high: when Eliot seeks an apparatus of metaphor on which to hang his speculations about the life of the spirit and the disciplines which may lead to mystical experience, he turns to the late Beethoven quartets; hence the title of his most considerable work, the *Four Quartets*. But he does not stop there. The work is full of other poets' experiences of a similar kind—St. John of the Cross, Dante, John Donne. And other works of art are held open to inspection—a Chinese jar, the music of a violin, and music heard so deeply that it is not merely heard, but the listener becomes one with the music while the music lasts.

In the same way Yeats turns to a Chinese jewel, a carving in lapis lazuli, and Ezra Pound to painters, architects, composers, artists of all kinds and of all eras whose works illustrate openly and clearly or more mysteriously what their art is about. But most of all, the poets deal with other poets and with poetry, conducting long colloquies with themselves such as those Paul Valéry made into verse and prose and all the notebooks of a lifetime of notebook-making, the dramatizations of the process by which a highly self-conscious man became more and more conscious of himself. Not, of course, that one discovers Valéry's self, but rather that one discovers Valéry in the act of discovering himself, presenting to others through the means of an alter ego the probings to which he submitted himself and hoping that the presentation of the probings will be enough to reveal something about the poetic process. That is enough. That is all that our hopelessly inadequate equipment will permit us to understand of poetry.

Drama

The drama in our time has turned just as resolutely in on itself. The revolution in the theater which began with Ibsen and Strindberg was always full of its own insurrectionary progress, no matter what the subject matter of any particular play. Most of the attention playwrights gave playwrighting was of a conventional kind, however, until the German expressionists and Luigi Pirandello between them made the drama the subject of their drama. Hauptmann, it is true, frequently explicated his work with comments on the playwrighting process and on the mounting of plays, and Shaw's plays more than once called attention to their own construction. But the full weight of the theater of process was not felt until Pirandello made the characters in a play the nervous and melodramatic progenitors of a drama and turned all the natural conflicts and tensions of the theater, between actors and directors and audience, into a taut allegory of the processes by which human beings fool themselves into thinking they have hold of reality.

Georg Kaiser and Ernst Toller made audiences almost as aware of lighting and movement on the stage as of the purposes, political and satirical and highly emotional, for which they were being used. Bertolt Brecht, even more intensely political than his expressionist predecessors, scooped the emotional center out of his plays and pushed his audiences as far from vicarious involvement with them as was possible, concentrating their attention, like his own, on the particular theatrical way he said what he did so that they might more coolly examine and accept his readings of history and human character. And the playwrights of antitheater, Eugene Ionesco, Jean Genet, and Samuel Beckett, made manner so thoroughly into matter that their audiences

were never very sure of what was being said or done on their stages, but only of how. If there was anything like realism in this drama, it was realism of small details, small details wrenched out of their place in a larger world and held up to close inspection so that the horror of the commonplace could be demonstrated and with it the still more shocking fact—as these dramatists view the world—that the ugliness of ordinary life can be so complacently accepted by ordinary people, ugly people. If there was anything like psychological truth in their plays, it was in the meticulous observation of fatuities, not only the obvious ones in the obvious places of which everyone is at least half-conscious, but the obscure ones spoken or acted in unlikely places and industriously concealed by a shamed subconscious.

One could draw conclusions from these plays, thick with human stupidity and carelessness and cruelty, somewhat less than complimentary to modern man. But however just these conclusions might be from the evidence presented, they would be an injustice to the plays and the playwrights. For unlike the drama of the German expressionists and of Pirandello, of Ibsen and Strindberg, Shaw and Hauptmann and even of Brecht, this kind of playwrighting comes to no conclusions. It is not designed to fire or to inspire audiences, nor to make them protest, nor to make them whimper, nor to make them roar, nor to make them beat their breasts in fury with themselves, nor on the other hand, with the ironic grace that permits the condemned creatures of Sartre's *Huis-Clos* to see hell as "other people," to help them exculpate themselves.

These playwrights, like so many of the other artists of our time, are process-servers. They observe. They probe. They do not conclude. They present in amusing, upsetting, confusing detail what they have seen, what they have found. Conclusions are not for them. Conclusions are for "other people."

3

the novelist-philosophers

THE FIRMEST refusals to make conclusions of all those who have refused to conclude—and they have been many—have been those of the most successful mythmakers of this century, the novelist-philosophers Marcel Proust, James Joyce, Thomas Mann, Virginia Woolf, and Franz Kafka.

Marcel Proust

In *A la recherche du temps perdu* Proust proposes a theory of knowledge that starts with an insistent underscoring of Bergson's concept of subjective time, into which everything flows, in which all dimension is shattered, by which everything outside a person —everything objective—is scanted, and with which everything inside one—everything subjective—is enormously enlarged. But for all the support given the theory, by a fullness of example and speculation and commentary by the narrator, it is not the theory that Proust's sixteen-volume remembrance of things past leaves with his readers but rather the people who exemplify and develop it for him. Furthermore the people do not remain in

the mind as figures in an allegory or symbols in an imaginative exercise. In spite of the efforts of some commentators to make them such, they are not counters in an elaborate apologetics for a flamboyant aristocracy or a life of sensuality any more than they are cautionary personifications of vice, warning Proust's readers against debauchery and decadence as they make their way sadly to perdition in a kind of pilgrim's progress through the Almanach de Gotha. If their excesses make an earnest plea for continence and their upper-class consciousness seems to demand an answering fervor for democracy, it is not by intention.

The vast work is one of observational architecture, constructed at different altitudes, not one of which is definitive, not one of which offers a clear way in or out of Proust's building. The plot is a series of views of a partyful of people. The method is kaleidoscopic, and just as it is impossible to turn a kaleidoscope back or forward to get exactly the same view twice, so is it fruitless to turn over the pages of Proust looking for fixed patterns, fixed characters, or fixed ideas. Time present and time future are both contained in time past, and time past can never be fully recaptured. The result is that we are never sure of any experience or of any person, not even of ourselves. Everything is in flux, everything is in process.

Thomas Mann

At the beginning of the fifth chapter of *The Magic Mountain,* Thomas Mann comments on the "phenomenon" by which the narrative of the first three weeks of the "stay" of his central character, Hans Castorp, in a Swiss sanatorium for the tubercular has occupied many pages—in fact, the length of an average novel—while the account of the next three "will be over and

done with in the twinkling of an eye." It is all a matter of "the mysterious element of time," and especially of the heightened subjectivity of a patient in bed responding to it: "They bring you midday broth, as they brought it yesterday and will bring it tomorrow; and it comes over you—but whence or how you do not know, it makes you quite giddy to see the broth coming in—that you are losing a sense of the demarcation of time, that its units are running together, disappearing; and what is being revealed to you as the true content of time is merely a dimensionless present in which they eternally bring you the broth." [1]

Illness is the catalyst of meditation in *The Magic Mountain,* the motive force for a dialectical examination of the intellectual currents of the modern era. It can be decided, and perhaps with far more reason than with Proust, that Mann comes out on one side or another in his extensive dialogue of the sick. He brings together an Italian rationalist, a Jewish Jesuit (a Jesuit manqué; a spot on his lung holds up his ordination), and a psychoanalyst and a physician. The last two are as unsound psychologically as the others are physiologically. But Mann's position is more exactly a sickness in itself: an addiction to paradoxical antitheses. He demonstrates not once but a thousand times that physical illness yields mental health, that rationality only conceals a feverish irrationality, that a bourgeois businessman hates and fears the artist only because he has a violent urge within himself to an artist's life, and that the artist scorns the businessman and everything bourgeois because he is secretly attracted to its softnesses and security.

Not only in *The Magic Mountain* but in all Mann's large-scale works, antithesis is at the core of his rhetoric, of his logic, of his psychology. His writings are elaborate presentations of the interweavings of character and idea, of the spirit of a given time and place, of the mystiques of personality and race and ideology.

None is altogether rejected. None is thoroughly supported or espoused. The man of intellect, as the rationalist Settembrini says of the Jesuit Naphta, "is always searching for new combinations, new associations and adaptations, new shades of meaning proper to the time." He is in fact, Settembrini insists, "a voluptuary" who threatens the stability of society because of the way his searching "relaxes manners and morals" and "frees man from discipline and restraint. . . ." In that sense, an intellectual such as Naphta may be "a power hostile to civilization and progress, to work and to life," [2] and Mann then seems to be raising his index finger in warning with Settembrini's.

But the process to which his mind is irresistibly attracted is the pushing, prodding, and opening of antitheses, and to these he returns again and again, as to so many oyster shells, inserting his knife, prying open the shell, and revealing—what? Something? Nothing? Process, process, process. Process, more or less Hegelian in its stately movement across conflicting attitudes, tangential ideas, asymmetries of the will and assonances of the intellect. Process building types and archetypes. Process constructing myths. Process making of the interactions and interweavings of people a marvelous, highly meaningful, but not quite translatable game which never ends. When Mann introduces, in his tetralogy *Joseph and His Brothers,* the episode of Joseph and Potiphar's wife, it is with a kind of apostrophe to his method, to his mélange of history, psychological casebook, and hagiography, to his process-fixed imagination:

Part of the game we play with life consists in the relations of human beings one to another. Take two people who have just exchanged their first glance—what could be slighter, what could be more unconscious, tenuous, distant, and casual than the bond between them? And yet it may be destined to take on, some unimaginable day, a character of burning intensity, a frightful and breathtaking imme-

diacy. Truly this game, and the innocence of the players, may well be the subject of head-shaking and pondering on the part of the forewarned observer.[3]

James Joyce

No head shakes so consistently while watching the game as that of James Joyce. But then he does not merely watch; he keeps score. He keeps it so well that all the while one thinks the game will end, that someone will lose and someone win; that Stephen Dedalus, his not quite precisely autobiographical character, will find his spiritual father in Leopold Bloom, that not quite Everyman; that Leopold Bloom will settle down with spiritual son and physical wife; and that physical wife, Molly Bloom, will be content to play Gea Tellus, old Earth Mother, in the old homestead in Eccles Street, and that a little of the ould sod will be enough for her and she will not have to keep the blazes burning. But then one realizes, after having examined the artist's self-portrait in detail, watched him grow from a small satire at his own expense to a huge farce at the world's, that Joyce's game is not quite that of the relations of human beings one to another. For the score he keeps is more verbal than psychological and more precisely linguistic than verbal.

Joyce is a great gruff grunting admirer of the sportive ambulations and disorderly permutations of language. He is endlessly delighted with the puns that can be made of multiple cognates, stretching from language to language and habit of speech to habit of speech. His mind, active as that of an unemployed scholar with a grudge against the academic establishment, is always tumbling words over against and upon each other in an effort to satisfy his voracious appetite for language. He is the

true voluptuary—and more, glutton, miser and prodigal—battening on language, fattening on it, wasting it, hoarding it. The incidental commentary on the follies of the sons and the fathers, on the follies of generations and generations of foolish men, superstitious men, suspicious men, sentimental men, but never quite sober men—that commentary is not lacking in compassion, but it is hardly filled either with the depths of the riches that his most eager and most innocent and most academic followers have suggested it is.

Joyce's profundity is a matter of words, but there is not much matter in them, for the metaphysics he shakes loose from time to time in *Ulysses* and in *Finnegans Wake* is of the order of a schoolboy's manual, a summary of the *Summa Theologica,* certainly not the work of St. Thomas Aquinas itself. The manual he would have used, it must be added, would have been a nineteenth-century one, a respectable one and a responsible one, full of the Latin of the Schoolmen and with arguments out of the Doctor complete. But to get Aquinas, or Augustine, or any of the Fathers, Bishop Berkeley or Sterne or Swift, or even Madame Blavatsky the theosophist—or anybody else—out of Joyce is not to get anybody at all, but just the scraps of a man that were preserved in the wild and wonderful mind of the writer.

Some of the scraps are appreciable, of course, and almost all are a joy to the imagination that can find and locate them in a context, any context. But scraps they remain, to be poked at, picked over, and processed through all the academic processes: listed, cross-listed, explicated, categorized, combined and recombined under the headings of all the disciplines of this century now prominent in the universities and all those that once were celebrated in the academies of the last century. They will prove, when poured over in this fashion, that Joyce had read the famous books, the obvious books—Shakespeare and Homer and Dante

—and the Irish writers, especially those who were his contemporaries, and the Bible; that he knew and used the Egyptian Book of the Dead and the Koran; that to Ibsen and Swift he paid particular attention; that he was learned in the cyclical theories of the eighteenth-century philosopher Giambattista Vico (who had the good taste in addition to his historiography to hold firm theories about the meaning and importance of language) and all the related philosophy, psychology, and pseudo-scientific method, ranging from Bruno and Nicholas of Cusa, to Freud, Jung, the Cabbala, Paracelsus, Hermes Trismegistus and all sorts of occultists and spiritualists of a far less distinguished order.

More than anything Joyce was a master parodist, but not always, beyond his use of language, a very subtle one. What he illustrated in his parodies was the mixture of wit and witlessness to which the conversations and speculations and semiconscious musings of ordinary people doing ordinary things are so regularly prone, not simply over and over again in their own lives, but "by a commodious vicus of recirculation" [4] over and over again in the race's life. Not only the process of daily life in our time, but of all time—that was Joyce's last contribution, the *Wake*.

Virginia Woolf

Virginia Woolf was content to light up a few moments in the lives of her characters, not necessarily the important moments, but typical ones. She offered revelation in patches, a revelation that was often no more than patches. But since patches are all that is reliable for the mind that sees reality as existing only in process, it was enough. Her cool clear style held those moments to the page like surgical clamps. The moments, the patches, the

light—all are unforgettable, even if their precise significance is as elusive to the reader as to the character himself. See, for example, how the British Museum makes its curious murky way into the stream of consciousness first of one and then of another of her people. The Jacob of *Jacob's Room* goes to collect his walking stick from the checkroom at the museum. It is removed from its pigeonhole, and the action frees some thoughts, from other pigeonholes, in Jacob: "There is in the British Museum," Virginia Woolf muses for him, "an enormous mind. Consider that Plato is there cheek by jowl with Aristotle; and Shakespeare with Marlowe. This great mind is hoarded beyond the power of any single mind to possess it. Nevertheless (as they take so long finding one's walking-stick) one can't help thinking how one might come with a notebook, sit at a desk, and read it all through. A learned man is the most venerable of all —a man like Huxtable of Trinity, who writes all his letters in Greek, they say, and could have kept his end up with Bentley. And then there is science, pictures, architecture,—an enormous mind." [5]

In *Mrs. Dalloway,* at the key moment in the narrative, when one of the central characters has just committed suicide by hurling himself out of a window, another of them, Peter Walsh, sees and hears the ambulance coming to pick up the mangled body from the pavement. He has just returned to England from India. The ambulance catches him in midstream at a pillar box opposite the British Museum: "One of the triumphs of civilisation . . . Swiftly, cleanly the ambulance sped to the hospital, having picked up instantly, humanely, some poor devil . . . That was civilisation. It struck him coming back from the East —the efficiency, the organisation, the communal spirit of London. Every cart or carriage of its own accord drew aside to let the ambulance pass." [6] Walsh worries that his thinking about the

incident may be a sign of morbidity or sentimentality. He comforts himself that in his loneliness he may do as he wishes with his emotions; in "privacy" one may weep or laugh at will. "I have that in me, he thought standing by the pillar-box, which could now dissolve in tears. Why, Heaven knows. Beauty of some sort, probably, and the weight of the day, which beginning with that visit to Clarissa had exhausted him with its heat, its intensity, and the drip, drip of one impression after another down into that cellar where they stood, deep, dark, and no one would ever know. Partly for that reason, its secrecy, complete and inviolable, he had found life like an unknown garden, full of turns and corners. . . ." [7]

The turns and corners in Virginia Woolf are many, but the secrecy remains complete and inviolable. Each of her characters is exhausted sooner or later by the soft, quiet, terrible steady pressure of one impression after another. Each moves into the darkness, into the deliquescence of the hours of his days. Process, the process of living, melts these people, dims their substance, until there is nothing left in them but the blank melody the birds sing at the beginning of *The Waves*. Like Proust's Marcel in *A la recherche du temps perdu*, a taste, a touch, a sound can recall them to something like human activity: ". . . suddenly one hears a clock tick. We who had been immersed in this world became aware of another." [8] It is not a pleasant but a painful experience thus to be summoned back to life, to another's life.

As Mrs. Woolf takes apart this most frequent of occurrences, this most trivial of encounters, we realize how much of ourselves is bound up in the recurring and the ordinary, and how much of it is not pleasant: "A sound was heard in the hall. What he was saying wavered in the air like an uneasy flame. I watched him disentangle one footstep from other footsteps; wait for some par-

ticular mark of identification and glance with the swiftness of a snake at the handle of the door . . . So concentrated a passion shot out others like foreign matter from a still, sparkling fluid. I became aware of my own vague and cloudy nature full of sediment, full of doubts, full of phrases and notes to be made in pocket-books." [9]

Such acute awareness of a day's events exerts a terrifying pressure on the nerves; it acts like a neurasthenia which localizes all emotional disorder in an extravagant amplification of sound that turns a whisper into a cannon's roar; it makes the weight of each day an almost intolerable burden. One can understand how difficult Virginia Woolf found the days, the hours, the moments when talk sputtered in the air like poorly fed flames and the approach of someone behind a door brought all energies to bear on the door's handle with the speed and concentration of a snake. The rhetoric is significant: Fire and snakes—things that move destructively; things that devour. Death comes, at such a point, at such a magnification of trivia into torment, when the process of living has become a tyranny from which one cannot escape—death comes then as the best of all possible ends. At such a point, for such a person, life cannot be proud. At such a point, Virginia Woolf took to the waves: she walked into the Thames.

Franz Kafka

It can be argued that the most process-ridden of modern figures, Franz Kafka's Joseph K., takes his own life in *The Trial.* The mysterious figures who arrest him, accuse him, condemn him and execute him are never identified. His crime is never specified. It is his own sense of guilt that, after he has been

freed, makes him insist on a crime and a verdict from the court, requires him to hire a lawyer and to spend all his time and all his energy seeking out the charge and the judgment and defending himself from it—whatever it is. Finally two men dressed in the courtly garb of executioners—frock coats and top hats—come for him, to bring an end to the deadly process of interrogation, the trial of others, the trial of himself, the trial of everybody, on unspecified charges. They take him to an empty quarry and plunge a knife into his heart.

No myth in our time is more to the point—or the pointlessness—of our time. None deals more convincingly with the sense of guilt and helplessness felt by ordinary men who have lost themselves doing ordinary things in an ordinary world. Joseph K. is an office worker, a pin in a wheel, one of many pins in many wheels. He has some small competence. He is chosen to take in hand a visiting Italian dignitary, to show him around, to answer his questions. He cannot really answer the Italian's questions, however: he cannot answer anyone's questions: he cannot answer his own. Life as a pin has left him nearly mute. He has not yet become the animal into which a whole bookful of Kafka's beleaguered creatures turn—or perhaps he has gone beyond the ark into the machine, having become a pin, a cog, a Joseph K. pin or cog, with its own hole in which to hide, to function, to fail and to die, to be replaced in turn by another pin.

Life has a momentary significance for Joseph K. just as it is about to disappear, just because it is about to disappear. The people who enter his world as he attempts to discover his crime and defend himself are of greater moment and dimension than any others he has ever known—his lawyer, the Advocate; an artist, the painter Titorelli; a priest in the cathedral, chaplain of the prison, and minister, for a few minutes, of Joseph K.'s

soul. For long stretches of time he enjoys his guilt. He is no longer such a little man. He has become a hirer of lawyers and a petitioner of courts. He visits important people who may be able to exert some influence for him. He has come off the office assembly line and into the world.

But the enjoyment cannot last; it must swallow itself up. For it is the pleasure of the dying patient who has found himself of interest for the first time in his life. All that remains for him now is the last of petitioners, the last of the important persons who may be able to exert some influence for him. A figure, with arms outstretched in the shape of the Crucifixion, appears at the window of a house near the quarry in which Joseph K. is about to be killed. Once again, K. cannot answer questions; he can only ask them. But these questions are rather better than those he has been asking until now; at least they stand a chance of being answered:

> Who was it? A friend? A good man? Someone who sympathized? Someone who wanted to help? Was it one person only? Or were they all there? Was help at hand? Were there some arguments in his favour that had been overlooked? Of course there must be. Logic is doubtless unshakable, but it cannot withstand a man who wants to go on living. Where was the Judge whom he had never seen? Where was the High Court, to which he had never penetrated? [10]

In German, the title of Kafka's novel is *Der Prozess,* which means both *The Trial* (or perhaps more accurately, *The Lawsuit*) and *The Process.* Joseph K.'s trial is a trial by process, but it is not a trial that begins when he is arrested in his room by officials of the court. The trial of Joseph K. has its beginning whenever process first slips its noose of gears around him, when his work first becomes a source of guilt, his leisure a source of guilt, his consciousness of self a source of guilt. All are the same for him—self, leisure, work. All are dressed in the ragged gar-

ments of tentativeness. None is an end for him. But neither is any a means; not one of his central activities leads anywhere. Purpose is denied him, as it is modern man so much of the time, by the enforced concentration on process, the process of the bureaucracy in which he works, the process of his relations with other people, the process of his shadowy allegorical trial. Like an up-to-date intellectual (which Joseph K. certainly is not), he submits everything in his life to the devouring scrutiny of the process-haunted mind that must examine everything that is happening while it is happening—social exchanges, sexual exchanges, spiritual exchanges—identifying every part in the process as it pops up and performs its function.

Like the man of large disbelief (of whose group Joseph K. certainly is not an official member), he cannot trust anything that he cannot see and touch and hear, and he is even suspicious of the witness the senses provide. Like a good twentieth-century man (which Joseph K. certainly is), he is a man afraid. Anti-metaphysical, without faith in anything or even a clear willingness to accept the possibility of faith, he is pursued by wraiths and ghosts, the long-repressed personifications of purpose that finally track him down and kill him. Their only purpose may be to kill him. His only purpose in life may be to die. But there comes a time when that is purpose enough, just so long as it is purpose. One cannot live by life alone, saying to oneself that one is alive, finding comfort only in that fact, doing everything to prove just that fact. An existentialism that subsists on life alone, that can give to life no further support than a description of itself, will eventually yield nothing more than the nausea that a certain number of existentialists have found in life.

The really ordinary man is one who is no caretaker of words, is one who cannot sit in a Swiss sanatorium examining the intellectual currents of our time, is one who cannot lose himself

in a contemplation of the processes of painting or music or architecture, is one who cannot find a lofty satisfaction in the patterns of mathematical logic or a happy dissatisfaction in the patterns of society and the human psyche. He is as deeply involved in pattern and process as any of the others. But how different a pattern, how different a process!

The ordinary man sits in a stupor, nagged to death by a sense of guilt like Joseph K.'s, no more certain than K. of what it is that he is guilty. He has heard brave orators on radio and television or in pulpits say that we are all guilty of the atomic bomb and he has wondered, with that simple cause-and-effect logic upon which he is dependent, what he had to do with Hiroshima or Nagasaki or the subsequent tests; he only knows he wishes *they* had never put together the damned things and who consulted him anyway? He has been subject to personnel people who have sat him down with ink blots, and then on the basis of a few vague stray impressions—which *they* asked for—have told him all sorts of unpleasant things about his imagination, or rather his imaginations, the one he knows and has allowed free rein, and the other, the one he has suppressed and does not know, the one that *they* know.

This ordinary man has learned from newspaper columns and magazine articles and films and television and radio dramas a few cursory facts and many more rambling fantasies about his subconscious life and others'—just enough to realize how sick most of us are. His wife, who with the first child was content to follow the instructions of her mother, with several more has become moderately learned in the psychological adventures of the very young and immoderately garrulous about her small lore gathered from women's magazines and daytime serials and nighttime conversations with other lay analysts of her class and generation and sex. His teen-age children seem to know a great deal about

a great many things, or at least so he gathers from the simple blunt things they say and the not-so-simple other things at which they hint and he worries about those things, the ones hinted at, and what they suggest about the behavior of those kids, the scandalousness and rascality of which the stories in the papers more than suggest.

This man has perhaps a modicum of religious faith, or at least the habit of it, but not enough understanding of an intuitive kind and not enough instruction of any kind to see where and how it applies to his situation. He knows his is a "situation," a parlous one. He has read just enough in the popular press or the union and company papers, and heard just enough from his contemporaries, to want to push his way slowly through a book or two that he did not quite make sense out of. He has learned, with difficulty and no clear comprehension, that all his vague discontents and ambitions and uncertainties add up to loneliness and goallessness and anti-intellectuality. Actually, he has nothing against intellectuals, although he is somewhat suspicious of the way they talk, and he wonders if their thinking is as obscure as the language they use. He has a goal, all right, several goals, financial most of them, designed to bring more ease and leisure into his life and a more productive use of the leisure he has. If it were possible to understand his children, if that were even imaginable, that would be a goal, and if he could stamp out the sense of incompleteness that sometimes appears as guilt, that also would be an aim.

Because this man cannot see—for all the psychological aid available to him at the plant, in the papers and magazines, from his wife and children—much likelihood of those ambitions being realized, he falls into what he recognizes as loneliness, and becomes all the more lonely with each article, each conversation, each drama that tells him, with an accusing tone, that he is

lonely. He feels more and more like Joseph K. He looks more and more like the poor little creature, not quite transformed as yet into a thing, who inhabits Paul Klee's *Twittering Machine* world. He is uncertain and afraid about the world around him, uncertain and afraid about his job, uncertain and afraid about his friends and family, uncertain and afraid about himself. His personality is badly dented. He is a man sorely tried by his world.

The distance between the average man and the highly gifted and trained one is no longer very large, in spite of the great differences in taste and experience, in job and daily routine. One plays Hamlet in blank verse, the other in prosaic discourse. Both are capable of terrible vacancies of thought and feeling, both of passionate complaint. Both look for what is called, in a term packed with cold meaning, "professional help"—not charity, not love, but the offices of an analyst. Ulcers, high blood pressure, nervous breakdowns are no longer upper-class afflictions, nor are the psychological illnesses that underlie them. The great disease of the twentieth century is the damaged soul, and it is epidemic among the classes and communities of the world.

To say in the face of such a world that Kafka's allegories are exaggerated or illogical is to talk nonsense. The miseries of Joseph K. bear the closest relation to those of millions of people in this century. Less than twenty years after he began to write *Der Prozess,* its horrors were being re-enacted in Kafka's middle Europe by the Nazis and their victims. And how many more in Mussolini's Italy, in militarist Japan, in the Communist countries we will never know; there are no methods of statistical analysis for calibrating the damage done to a soul. Furthermore, there is one way of combating spiritual plague that makes the illness look like the highest good health, that is by a stoicism of the will that ends by effacing the will altogether. The depersonalized faces of the Chinese who have become steel pud-

dlers in their own backyards suggest that that is what they have done in Mao Tse-tung's gigantic anthill. How far is that from Kafka's world in which a young man unable to face reality as a human being turns into a cockroach?

To say in the face of such a world that Kafka's allegories are not at all exaggerated or illogical is clearly not to talk nonsense. But to insist with melancholy certainty that his is the true picture and the only true one of the world to come is to see man much smaller than he did. For Kafka followed *The Trial* with another allegory, *The Castle,* in which another K. makes another kind of assault on reality. Once again a man seems to be persecuted by unknown forces, and once again seems to be without clear friend or open-faced foe. K. has been hired as a surveyor by agents of the Castle's ruler, the Count. But he is never able to get into the Castle, never able to find anyone of sufficient importance in the life of the Castle to explain why he was sent for and then apparently rejected. Mercifully, perhaps, Kafka never finished this book. There is no end to its allegory. The mystery that this K. has set himself to solve is beyond human solution. It is a true mystery, not a problem with a discoverable answer that one can find in the back of a book or at the end of a complicated process with a computing machine. It is the mystery of being.

In a collection of notebook entries that he called "Sin, Suffering, Guilt, and the True Way," Kafka identifies original sin as impatience. Impatience is modern man's besetting sin, as it is Joseph K.'s. Modern man has become so used to finding the solutions to his material problems ready at hand that he expects—or at least long expected—all other difficulties to be dealt with as easily. When the problems of the spirit did not solve themselves, when in fact they established themselves as insoluble mysteries, he found his solution: he simply refused to admit

their existence and he appointed a committee of wise men—scientists, psychologists, sociologists, anthropologists, and philosophers—to prove he was right. They proved it to him, but not quite conclusively. Having eschewed all conclusions in favor of process, they were not able to make any conclusions stick. Impatient man remains uncomfortable. Wrapped up in process, he feels like the emperor in his new clothes, naked. He can no longer, he thinks, take up and wear the discarded clothing. But as he is dressed now—or undressed—he seems to be prepared only for the grave of the future.

PART II

THE RESPONSE OF SCIENCE

4

man before nature

The terrors of nature and the cultural divide

MAN cannot live by dread alone. He must find sustenance of a more joyous kind. If modern man were a natural man he would discover joy in the world around him, in nature, and he would sustain that joy and fill it out with all that the sciences have unearthed. But instead, he fears nature as something diseased, his enemy, and he turns from science and scientists as from a world apart, not yet an enemy, perhaps, but certainly no friend.

Nature certainly can seem like no beneficent mother at all, but rather like a hostile stepmother. She presents us again and again with poisons to suck out our lifeblood, with growths that feed on and destroy our bodies. She preys on little children, tortures them with paralysis and deformity. She leaves the old feeble, almost helpless, and not content with that degradation, convulses their limbs with arthritis and dims their hearing with deafness, and cripples their sight with cataracts, to remind them each day of their increasing reduction in dignity and power. And when she is not attacking man's person directly, what does she offer him but earthquakes, hurricanes, tornadoes, and disgorgements of snow, rain, heat, cold, and humidity that make

whole weeks on end unlivable. In this diabolic mood, her collaborations with science produce planet-shattering explosions and mushroom clouds that threaten to make deformity universal and survival no kindness at all.

Science once seemed to man the answer to an antagonistic nature. It could defeat it by nostrums for disease and, until each of the specifics turned up, could at least neutralize nature's terrors by painkillers and an elaborate machinery of crutches, braces, iron lungs and plastic oxygen tents. But science, like nature itself, was not content with a benevolent role. It withdrew more and more from the civilization it had helped to build and to prosper. First it insulted that civilization by refusing to speak a language that anyone besides its own cultists could understand. Then it threatened to destroy civilization with the unbelievable weapons that it invented in its laboratories. The laboratories themselves looked as if they were designed by the Marquis de Sade and were kept in shape by Struwelpeter. Filled with terrible noises and nauseating mists produced by ugly-looking fluids and gases packed away in uglier containers, each was brimful of explosion and threatened to join force at any time with all the others to blow up the world. And perhaps with the plans of geneticists to improve the race by plucking embryos from mothers' wombs and reconstructing them, and with artificial insemination by anonymous donors already a significant means of begetting children, and with all the new psychological illnesses discovered every day, and with the weapons of which science has made a present to the military establishment, and with cancer and encephalitis and all the other ancient horrors still with us, and multiple sclerosis and muscular dystrophy and all the other new ones no nearer cure, perhaps it would be better if the explosion would come.

What C. P. Snow calls a "cultural divide" does separate scien-

tists from nonscientists and come very close to preventing rational thought on the part of the nonscientist about the scientist and his domain. Snow is most alarmed about the "deeper insight into the scientific revolution" that the Russians possess, so deep that it constantly makes more narrow the gap between the "two cultures," that of the "literary intellectuals" and the physical scientists. The gap between scientists and nonscientists in most Western lands is so wide that these nations are impotent to do what they should; to use their own resources and to help others, the new and growing nations of Asia and Africa, to use theirs. This is not the time, Snow says, for saints, who tend to be paternalistic, no matter how noble they may also be: "These are not the Europeans whom Asians and Africans are going to welcome now. They want men who will muck in as colleagues, who will pass on what they know, do an honest technical job, and get out." Happily, he points out, this is the sort of thing scientists do without any trouble, almost naturally: "They are freer than most people from racial feeling; their own culture is in its human relations a democratic one. In their own internal climate, the breeze of the equality of man hits you in the face, sometimes rather roughly, just as it does in Norway." [1]

The separation is serious, just as Snow indicates. It marks a political problem that must be solved, and solved as he indicates, by a violent change in educational procedures, unless the West is willing to accept a minor role in the world of the future, and to become an enclosure in society, shut off from other countries and other cultures, a historical oddity out of touch with the new civilization. If we do not solve the problem, then the Communist countries will, Snow points out, at no matter what cost to them or to us. But, it must also be pointed out, if we solve it as they do, and for the same reasons, for political reasons, then we shall not have solved it at all, any more than they have. The

gap will remain, and the enclosure too. But the enclosure will not simply be that of the West in a Communist world; it will be of worlds within worlds, with Western scientists isolated from the rest of the West as the West is separated from the rest of the world.

The political solution here must follow a more fundamental one, one that is not only intellectual but spiritual, which will bring together all the cadres, all the cultures, of every society. This may not be the time for those "Europeans, from St. Francis Xavier to Schweitzer," who "have devoted their lives to Asians and Africans, nobly but paternally." [2] But it surely is the time for those men, European, American, Asian, African, who can devote their lives to each other: nobly, let us hope; paternally, if they must, because of their superiority of knowledge; any way at all that will break down the antipathies between the two cultures and return mankind joyfully to the nature from which it has withdrawn in terrified retreat.

The realities of nature

The return to nature cannot be effected by a military strategy which simply sends men into the forests, into the fields, onto the lakes, onto the rivers, across the oceans, and high, high into the air. However entertaining and instructive these journeys may be, by definition they only touch surfaces. To expect nature to yield to the approach of a bus, a cabin cruiser, a train, or a plane, is to underestimate its toughness, its complexity, and its wisdom. The opposite approach, on hands and knees, with every inch of earth and every drop of water subjected to the scrutiny of microscopes and telescopes and all the other accouterments of machine-fed eyes, will not work either. Only a mind notoriously gullible will expect really to penetrate the skies by holding a

glass up to them or really to see into the mysteries of matter by means of still another piece of glass.

Instruction is required, meditation demanded, before nature will yield much. With scientists available, in staggering number, to instruct, and their extraordinary works, side by side with the natural world in which they have worked, to elicit the necessary meditation, the procedure is clear enough. But this procedure is not like that of the social scientists—so-called—who ape the attitudes and techniques of the physical scientists rather than understand them.

To follow after the scientists into nature is not to gather great quantities of jargon, carefully herded into categories, so that one can describe quickly, nervously, succinctly what one sees or what other people see, and then follow the verbal description with a more brief mathematical one that carries the awesome authority of the compact formula. To find one's way as the scientist has, is to pause with an entirely different sort of awe before nature itself, any part of nature, any function of nature, in any season, in any part of the world. One must be willing to stop before a diseased elm as admiringly as before a healthy maple, to consider with equal respect the fungus and the flower, to see the beauty of color and texture and form in a slime mold as certainly as one does in a rose or a lily. Without fully understanding what it is that makes these levels of life, each of them, intrinsically interesting and beautiful, one must be willing to concede that they are both.

The scientist's role

The scientist has a kind of charity, at least in dealing with nature, that the ordinary man hardly suspects and does not often understand when he is confronted with it. Whether his speciali-

zation is large or small in scale, whether he deals with creatures that breathe or creation that does not, whether he works out in the open or confined to close quarters, the scientist must be devoted to the materials with which he works. He must see in an insect or an atom, a gas or a smear across a slide, a machine separating and combining numbers or a number entirely isolated from men or machines, something that is good, that is true, that is beautiful. No mother can be more loyal to her children than a scientist to the matter of his speculations. He must inspect everything connected with his work critically, but not because he plans to accept some part of it as particularly worthy and to reject another part as especially unworthy. What he seeks in these inspections is truth, even if the most tentative and necessarily short-lived of truths. It will be enough, often, to make his point, to bring through an experiment to a logical end, or to complete an observation. It will bring cheer and satisfaction. It will remind him again of the breadth and depth of his calling, of the frequency with which he can start something and finish it, and at the same time of the incompleteness of any finding, as he realizes how much his work depends upon that of others and how much—he thinks hopefully—other work may in turn depend upon his. His mood will often be a mixture of humility and pride, but it will never be a disrespectful or an unloving one.

Much of the time the scientist will seem to be attached only to processes and problems; indeed he will seem to be poking away at the special concerns of his field with all the glee—and the profundity—of a crossword puzzle fanatic, and will appear to be more satisfied with a new method he has turned up or a new set of instruments than with any penetration into the heart of matter. But the scientist of quality goes much deeper than the levels of either puzzle or method: instruments are to him just

that, instruments, agents for inquiry, never an end in themselves. Instruments and methods are valuable. They often lead the way. So do puzzles. The love of puzzles of so many modern scientists has had a far-reaching effect upon the whole inner structure of physics and mathematics that deserves very careful study by nonscientists, especially philosophers, psychologists, and historians. But these are, even in their most profound and least gleeful employment, signs only, signs of a very special attachment on the part of the modern scientist, signs of that contribution which has remade his thinking and could, with enough understanding on the part of others, considerably change their thinking.

The method of the scientist is usually inductive. He proceeds from the sign to the thing, from what is seen to what rests behind it, from effect to cause. He has been following this procedure at least since the seventeenth century, when Francis Bacon made it classical for all experimentation by his translation of his own somewhat superficial experience as an experimenter into a set of speculations of an extraordinary reach and depth. At the same time, in the same century, a similar breadth was given to all general inference from particular experience by the work of Pascal, Descartes, and Leibnitz. Authority, in Pascal's words, "has the principal weight in theology, because there she is inseparable from truth, and we know it only through her. . . ." But, he insists, and all science has long insisted with him, "It is not the same with subjects that fall under the senses and under reasoning; authority here is useless; it belongs to reason alone to know them . . . subjects of this kind are proportioned to the grasp of the mind, it finds full liberty to extend them; its inexhaustible fertility produces continually, and its inventions may be multiplied altogether without limit and without interruption. . . ." Thus he establishes the province and the procedure

of geometry, arithmetic, music, physics, medicine, architecture "and all the sciences that are subject to experiment and reasoning. . . ."

The case is clear, and on the evidence, whether of reason or revelation, irrefutable. But it is not as simple as some of the simplifying minds of the nineteenth century tried to make it. It is not a case for induction at the cost of all deductive reasoning. And it is by no means a basis for a naturalism so restrictive and a science so self-centered that together the naturalistic philosopher and the experimental scientist can rule out all speculation that extends beyond the experience of the senses in the laboratory. That is not science but scientism. And that is, equally, not where any of the great progenitors of modern scientific thought intended their thinking to lead. Certainly it is not what the great revolution in science in the twentieth century has established or can be used to re-establish. Dogma has no place in science. Whether used to assert the all-seeing wisdom of scientific method or to topple other dogmas, those of religion for example, it is an intrusion and altogether out of place. It turns science into a fuzzy imitation of theology and scientists into woolly-minded mimics of theologians. It does not advance the work of science. It does not—if this is any kind of a goal—really impede the progress of theology. It simply stands between science and theology, like an enormous area of briar patch through which one can just dimly see to the other side, but into which no one can comfortably go.

One can understand the zeal of the nineteenth-century materialist. He thought he had seen through the briar patch clearly and had discovered at the other end of it nothing more than scores of devout religionists adding furiously to it more and more layers of briar. He determined to remove the patch, working twice as fast as the religionist to do so. He would rip loose from

the path of the seeker after truth every obstacle to understanding and make clear, with one glorious rip, to all seekers that the quest was over: truth was here in a world of matter. Some of the ways to truth were still clogged with debris left behind by willful cloggers. But they were being cleared away, more of them every day. It would not be long before the absolute relativism of science would be established. And then each of the problems which had befuddled the world for so long would be solved: those of becoming—growth and decay, an adequate food supply, proper shelter for all, indestructible clothing—would be tended to immediately; those of being—life and death—a little later.

The materialist is often motivated by humanitarian ideals. The things of the flesh worry him so dreadfully because he is really stung by the ills of his own flesh, and those of others at least as much as his own. He is too overcome by human misery to be able to put up with it, even when it is clear that some of those he adjudged most miserable have found a calm way of living with their own difficulties and are much less compulsive about removing themselves from their conditions, or having their conditions removed from them, than he is. And so, idealist that he is, he moves compulsively, convulsively, to make reality over into the ideal. Quickly, almost as quickly as he sets up welfare agencies and summons aid for the oppressed, he moves to attack those who stand in the way of progress—that is to say, those who obstruct science—and to outline the functions of those who will really work for the common weal and eliminate suffering—that is to say, scientists. The result of his elaborate program is a politics of belief, or really of antibelief, and a philosophy of process, in both of which the principal role is played by the scientist.

By this reasoning, the scientist becomes a crusader, willy-

nilly, whether he wants to or not, with all his attitudes worked out in advance for him. The most far-reaching and the most pernicious of these is the central conviction that in the chain of effects and causes, to the linking of which he has been elected, all things can be located; and once located, described; and once described, understood. And so the inductive method once celebrated by Bacon, Pascal, and Leibnitz for its fairness to the facts of experience and its openness to reason turns into the Chain of Becoming, a closed system in which authority plays a role at least as tyrannical as that forged for it by medieval thinkers in the Chain of Being, and with far less excuse, rhetorical, philosophical, or experimental, for its position in the new chain, than in the old.

Science never did behave quite according to the materialist's rules. Many scientists did try in the nineteenth century to give scientism good service. They did their work in the laboratory or in the open field and then, in the lecture hall or the pages of their books and magazine articles, dutifully totted it up to the cause of materialism. They engaged in debate. They demonstrated with test tube and chart and a blackboard full of formulas the inner contradictions and utter fraud of a crippled and fast-dying theism that could not or would not admit, as all honest and adequately equipped minds must, that all effects have an explanatory cause which somebody's experiment somewhere someday would inevitably locate, describe, and explain. Many scientists did this job of work in addition to their regular chores. But many others did not. They were perhaps a little more slow on the lecture platform or less articulate in the vocabulary of intellectual journalism. Some had not made up their minds about the significance either of their own individual contributions to science or of the contribution of science to the world. Others, the slowest of the lot to learn, were still attached by the glue of tradition or the nails of education to outmoded ideas

of being and a conviction of order in the universe projected from a source well beyond it, though not outside it, which continues to direct its affairs in some way or other.

What was most remarkable about all of these men was their continuing attachment to their experiments and their more limited speculations about them. Science held their loyalty. The world of matter they observed and meditated upon—the world of subjects "proportioned to the grasp of the mind"—drew their attention and elicited from them just that "inexhaustible fertility" that Pascal promised. Within the realms of science, they were co-workers. They found a fraternity there large enough to transcend other convictions about the significance or insignificance of metaphysics and even about the ultimate meaning of their own work.

Two other worlds: the macroscopic and the microscopic

The great sanity of the inductive method in the sciences is that while it does make philosophical differences unimportant for the duration of an experiment, it ultimately makes possible contributions to philosophy of the greatest value. It does so on evidence, not on the basis of bias or even a less tightly held conviction. It can even, by a breathtaking paradox, prove itself inadequate and the apparent facts discovered through its means untrustworthy, as it has in our time in the destruction of many of the most firmly established laws of classical physics. Honest observation and candid reporting of what has been observed have worked together to establish the inadequacies of the findings of physicists working with macroscopic bodies (that is, bodies large enough to be seen with the naked eye as distin-

guished from invisible particles). The laws of a universal determinism assumed by physicists ever since the seventeenth century to govern the behavior of matter have been all but demonstrated to be an illusion, in spite of "the admirable precision of the predictions of mathematical astronomy," as Louis de Broglie puts it, and the "daring suppositions" that "the mechanical and electromagnetic laws of the atomic world were identical with those which we establish for macroscopic bodies." [3] Verifications were not accurate on the scale of macroscopic phenomena, and therefore the determinism that was deduced from their behavior was only apparent.

The behavior of elementary particles would offer a kind of proof for determinist theory if it were in accordance with the classical conception of matter, that is if it were contingent, dependent upon rigorous laws, no matter how apparently unstable and beyond our own ability or that of our machines to calculate. But after the development of quantum mechanics, it is difficult to speak of small packets of light or bundles of energy behaving precisely according to the inflexible laws postulated by an earlier physics. It is not easy to reduce the microscopic or the macroscopic world to a set of simple contingencies any longer, even at the level of hypothesis, though for the purposes of daily life and classroom introductions to the material world it may be useful to accept some of the postulations of classical mechanics. But it must be remembered that these are only probabilities, based upon statistical averages. Furthermore, elementary particles, far more eccentric than macroscopic bodies by the standards of human behavior, are beyond the realm of exact prediction. Their world is that of chance; their laws, those of probability; their language of description, that of statistics, not of contingency. De Broglie sums up concisely much of what we know about the nature of elementary entities:

The present quantal theory deduces that their evolution cannot be regulated by a rigorous determinism, at least by a determinism which we could attain and state precisely; in our knowledge of them there always exist essential "uncertainties" which we have no means of eliminating. Nevertheless that is not to say that we could make no prediction for phenomena on the microscopic scale, but the only predictions that we are allowed are of a statistical nature and are expressed in the language of probability. Henceforth we can no longer say "at such an instant such an electron will be found in such a place," but only "at such an instant there will be such a probability that an electron will be found at such or such a place." It is only on the macroscopic scale, when we are dealing with heavy bodies (in comparison with elementary corpuscles) that the classical ideas of mechanics, such as position, speed, trajectory, motion, rigorously predictable in the course of time, will again become very approximately valid. The laws of mechanics thus cease to be applicable to elementary phenomena and must give way to statistical laws. It is only when we observe, with necessarily limited precision, phenomena on a large scale that we are able to entertain the illusion that there exist rigorous mechanical laws implying an absolute determinism.[4]

What the change from contingency to chance as a governing principle has done to the psychology of physicists trained in the old order is not hard to understand. Such scientists must feel today as some of the die-hard theists did in the scientific world of the nineteenth century, while so many of their colleagues were trumpeting the scientific millennium and proclaiming the world of spirit conquered, the world of matter triumphant, and all but the last details of existence explicated. But now it is not simply a swing in the other direction, as the supporters of a facile and playful historicism seem sometimes to think, with science following up and down and across with the direction of fashion, now deterministic, now antideterministic, and then back again to a fixed and firm causality. The change now is more fundamental than that. The confluence in this century of the theory of relativity, quantum theory, and atomic physics has left the world an

entirely different procedure to follow in the physical sciences—or rather has left it no clear procedure. Inductive methods still provide the daily structure of a physicist's working life, but he has had to supplement them with the speculative activity of a mathematician and a philosopher, and he can no longer assume the governance of rigid laws of causality, without seeming capricious in his philosophy and perhaps even misinformed in his science.

The invalidity of the idea of mechanical determinism in modern physics was admirably stated by the mathematician and physicist John von Neumann thirty years ago, just before leaving Germany for the United States. He uses the word "causality" where De Broglie, who quotes him, "would more readily employ the word determinism":

> One can sum up the state of the problem of causality in the physics of today as follows. In macroscopic physics no experiment proves causality, for the apparent causal order of the macroscopic world has no other origin than the law of large numbers and that is altogether independent of whether the elementary processes (which are the real physical processes) follow causal laws or not. That objects macroscopically alike behave the same, is something which has little to do with causality; these objects are not, in fact, really identical, for the co-ordinates which define the state of their atoms scarcely ever coincide, and the phenomena macroscopically observable are the result of averages taken from these co-ordinates.
>
> It is only on the atomic scale in the elementary processes themselves, that the question of causality can be really put to the test; but on this scale, in the present state of our knowledge, everything tells against it, for the only formal theory agreeing within a little with experiment and summarizing it, is quantal mechanics and it is in complete logical conflict with causality. . . . There exists today no reason which allows us to affirm the existence of causality in nature: no experiment can supply the proof of it, since macroscopic phenomena are, by their very nature, incapable of supplying it and because the only theory consistent with our knowledge of the elementary phenomena leads to its rejection.[5]

The rigid determinist insists that the contingent character of microscopic phenomena is only apparent, and that if we could observe elementary particles with accuracy and in great detail they would turn out to be governed by the firm laws of classical mechanics. But, as De Broglie says with a rhetorical mournfulness, "Unfortunately we cannot, in fact, follow the movements of molecules; their co-ordinates and their speeds are for us quantities for which we are unable to fix the instantaneous values; these are 'hidden variables' and it is because the observable phenomena result from averages taken with respect to these hidden variables that they can have only an aleatory character." Nor can we restore the order of determinism by the hypothesis of an understanding of the exact values of the hidden variables. Von Neumann has "proved," in De Broglie's estimation, "that the laws of probability expressed by the new wave and quantal mechanics for elementary phenomena, laws well verified by experiment, have not the form that they should have in order that we should be able to interpret them as due to our ignorance of the exact values of certain hidden variables." [6] The result is a block against even a concealed determinism, although it is not necessarily established that pure chance reigns in atomic physics. However, the indeterminacy or uncertainty principle, usually associated with the name of Werner Heisenberg, certainly seems well established.

The language of uncertainty

It is not only the physics and mathematics of indeterminacy that is hard to follow. The language of uncertainty in physical science is equally bewildering to the nonscientist. Used to a natural language, based upon causal chains of a simple subject-predicate kind, the average man recoils almost in horror from

what seems to him a maltreatment of grammar, syntax, and logic by the quantum physicist.

What must be realized is that the causal chains are in fact physical in nature; that the logic man holds to be so firmly in his language of description is one of a determinist texture, in which the place of an object or the action of a subject are always clear. Speech of this so-called "natural" kind always follows an arithmetic of words, with the order of the parts of speech more or less established by the order of the world of nature. An object either is at one end of a table or another or somewhere in between or in motion between a particular pair or number of points. Not only does the average man always see things that way, but so did Newton, and so, after a fashion, did most physicists until the time of Planck and quantum mechanics. But now we understand that nature does not have to conform to the laws of language. It is more accurate to say that an atom does not have a clear place of rest or a clear orbit of motion than to try to establish either one or the other. The "interference of probabilities," as Heisenberg has called it, makes normal description of atomic behavior almost impossible.

The attempts of physicists to deal with this problem verbally have not been altogether successful. They have not yet found a way outside of mathematical symbol to express the modifications of what ordinary men would call logical or natural language patterns that quantum physics has uncovered. The physicist C. F. von Weizsäcker has suggested that classical logic may underlie and may be taken as *a priori* to quantum logic, as classical physics is accepted as anterior to quantum concepts. Classical logic could then be understood as a branch of quantum logic, just as classical mechanics is subsumed under quantum mechanics, but the more general and accurate logic of matter would be that of quantum theory.

The most striking concept that emerges from this way of using language is that of "complementarity." We say of an elementary corpuscle that it is neither in one place nor another; its location, we sum up, is not decided. But "not decided," we must understand, does not mean "not known." "Not known" would be the answer of the determinist, who would thereby be indicating that there was a clear location of the particle, but that we just did not happen to know it. The indeterminist uses "not decided" to express a situation that is different from one of precise alternatives but not directly opposed to it. He can say that the situation is "complementary" to a state of clear physical alternatives, or "coexistent" with it; or to describe the behavior of atoms more accurately still, he can speak, as Weizsäcker and Heisenberg and others do, of "coexistent potentialities." Heisenberg's summary of this employment of language may be helpful here:

> All these difficult definitions and limitations can be avoided if one confines the language to the description of facts, i.e., experimental results. However, if one wishes to speak about the atomic particles themselves one must either use the mathematical scheme as the only supplement to natural language or one must combine it with a language that makes use of a modified logic or of no well-defined logic at all. In the experiments about atomic events we have to do with things and facts, with phenomena that are just as real as any phenomena in daily life. But the atoms or the elementary particles themselves are not as real; they form a world of potentialities or possibilities rather than one of things or facts.[7]

5

physics and the mysteries

WHAT is the connection between physics and the other sciences? How successful are the attempts to translate the mysteries of life into physical terms? Niels Bohr, the atomic physicist, has made a substantial effort to answer both questions. He has been much impressed by the "complementarity" or duality of waves and corpuscles. In a curious way, that once again challenges the ability of words to describe, the waves and corpuscles come and go, in what has been called (by Erwin Schrödinger) a system of continuities and discontinuities and "quantum jumps." For Bohr, these are not contradictory phenomena but rather "complementary aspects of reality," which we must of necessity accept and describe together if we are to remain true to the facts of observation.

Bohr goes on from this kind of coexistence to postulate another kind where until now only opposition has been found. He sees in the totality of life phenomena a similar complementarity, which brings together physicochemical processes and the vitalism responsible for the evolutionary drive (what in an earlier and a simpler science and philosophy was called "the life force") in a way that makes it impossible to say whether the life force or the

processes are primary. Analysis of physicochemical processes in a living organism can go just so far without killing the tissues being studied. In the same way, the very process by which we examine quanta may alter the structure of the particles. Hence, in addition to every other sort of indeterminacy, there is the necessary incompleteness of any examination of a living human organism. And in any case, if one wanted to study the dynamism of a human being, it would, by definition, have to be alive. Nonetheless, a complementary relationship has been sketched and studies begun in this area which in turn may be said to be complementary to psychosomatic medicine and all speculations about the sequence of responsibilities, tensions and relaxations which are involved in the relations of mind and body. The studies may be, like the examination of the physicochemical functions of a living creature, necessarily incomplete, and perhaps more than that, still of so elementary a character that no conclusions of permanent value can be asserted. The very fact that a pattern of studies has been established is significant, however. It suggests the largeness of view that the language and vision of complementarity permits, leading inevitably to the establishment of an area of experiment and speculation compounded of microphysics and biology.

We know of the central importance of genes in the life history of any living organism, the equivalent of particles or of waves of light in their nuclear position within the sexual cells of the animal body. "We stand astonished," De Broglie says with good reason, "before the smallness of these directive elements wherein lies the whole mystery of life." [1] We know too that even after the essential growth process has been completed, microscopic brain and nerve cells continue to direct human activities. It may be, then, that in spite of the scale of the human body and all mammals, that we belong (as the quantum physicist Pascual Jordan

suggests) to the microscopic world rather than the macroscopic. And thus for progress in genetics and other branches of biology of a kind that matches the progress made in the physical sciences, it may be necessary to develop a language and a logic of a special kind, one that faces the complementary character of all life processes.

The range and relevance of complementarity

The consequences of the recognition of the central importance of the principle of complementarity are either shattered nerves or a state of tranquillity, depending upon the extent to which one is attached to analysis and process as a way of life. If one expects regularly to discover facts that can be put to immediate use, like the statistical samplings of political polls, surveys of breakfast-food purchases and tastes in the rear ends of automobiles, then the present procedures of the physical sciences will hardly be comforting. For they will bring more, not less tension. They will demonstrate how blurred are the lines that separate facts, ideas, whole disciplines. They will show that the subject-object relationship is meaningful chiefly in a copulative way, translating subjects into objects and objects into subjects, exchanging functions and precedences as Edmund Sinnott does in *The Biology of the Spirit* when he reminds us that the body is as much the product of the mind as the mind is of the body. This perception does not degrade the place of the subject—whatever it may be, animal, vegetable or mineral, living or dead. Nor does it make the object less objective. It simply insists first upon the complexity of relationships by which we obtain knowledge and then upon the further and deeper complexity of the knowledge itself.

Max Born, a major figure in the development of modern physics, suggests that the principle of complementarity resolves tensions rather than makes them. In determining the physical properties of a system, the quantum physicist must use more than one apparatus, mechanical, statistical, and perhaps electronic: "The different sets of concepts and the different experimental arrangements needed to obtain all possible information, are not contradictory, but complementary." If one understands this, one can see widespread applications "to other fields of thought. For instance, the eternal philosophical conflict over necessity and freedom of the will is thereby resolved; it is a question of two equivalent complementary aspects of the same situation." [2]

The physicist and Protestant minister William G. Pollard, in his *Chance and Providence*, uses the same principle to make essentially the same application in his discussion of the so-called paradox of freedom and providence, although at much greater length and with a greater fullness of example. "The necessity . . . for maintaining with equal force the reality of human responsibility for and divine determination of the course of events has all the characteristics of a truly complementary situation." When St. Paul says of a particular achievement, "I, yet not I, but the grace of God which was with me," we can recognize this "as the acknowledgement of a single reality which presents itself to our apprehension in complementary terms." In terms of traditional logic, St. Paul's statement is a paradox; but so is the statement that light is both a particle and a wave. To resolve the paradoxes requires a reorganization of "our thinking about the relationship between human knowledge and understanding on the one hand and the reality which we seek to know on the other." If we can accept the complementarity of waves and particles in matter, however inadequately we may understand that relationship, then we should be able to "understand how it

could be that the nature of things would be such that the reality we call 'decision' could present itself to our apprehension of it as both freedom and grace in complementary relationship." Thus we may overcome the need to talk of paradox, and perhaps relinquish "a view of the relationship between knowledge and reality which may be overly simple and naive." [3]

More keenly aware of their social responsibilities than ever before since the development of nuclear weapons, some scientists offer the principle of complementarity as a solution to the political tensions of the modern world. In a speech delivered to the officers of the Federal Border Patrol of West Germany, a force more or less military in character which defends the borders of the German Federal Republic, Max Born went on from the generalizations about complementarity quoted above to a significant particularization:

I have related to you how physics has succeeded in solving apparently contradictory situations and re-solving them into complementary ones. In politics and economics two systems oppose each other, one of which proclaims the freedom of the individual as a basic principle, the other the absolute power of society organized by the state. Could these not also be two complementary aspects of the same human situation?

Born's correspondence with the Russian philosopher Suvorov, in which, he says, he "sharply attacked dialectical materialism," the central foundation, at least verbally, of all Soviet intellectual activity, has shown him "that one can discuss such questions with Communist theoreticians." He was given further hope by a speech delivered by the then American Secretary of State, Christian Herter, in New York, in which he spoke of "a common interest . . . the all-powerful will to survive, which is apparent among free men and Communists alike," and of the possibility of building "a new relationship between the antagonistic sys-

tems," in which peaceful economic competition would be substituted for the arms race. And so, says Born, there is "complete coincidence" between the ideas of a modern statesman and a physicist. "This agreement of ideas springing from two separate worlds gives us hope that the human race will survive the present crisis." [4]

The last of the great paradoxes of the physical sciences is in this formula for survival. The clear recognition of differences makes agreement possible. The "dissolution," as Heisenberg calls it, of the "rigid frame of concepts of the nineteenth century," and the development of a language and a logic equal to the demands of indeterminacy must lead to a considerable expansion not only of our views of the world, but of the world itself. It is possible to contemplate a unification of states and peoples not on the basis of a unanimous agreement upon political system and ideology but rather upon a willingness to accept disagreement as a foundation for society, a willingness that grows out of the recognition of the essential complementarity of systems and ideologies rather than a necessary struggle between them. The concluding sentences of Heisenberg's Gifford lectures on "Physics and Philosophy" face both the dangers and the hopeful possibilities latent in the process of unification:

The fact that great masses of people become conscious of this process of unification leads to an instigation of all forces in the existing cultural communities that try to ensure for their traditional values the largest possible role in the final state of unification. Thereby the tensions increase and the two competing processes are so closely linked with each other that every intensification of the unifying process—for instance, by means of new technical progress—intensifies also the struggle for influence in the final state, and thereby adds to the instability of the transient state. Modern physics plays perhaps only a small role in this dangerous process of unification. But it helps at two very decisive points to guide the development into a calmer kind of

evolution. First, it shows that the use of arms in the process would be disastrous and, second, through its openness for all kinds of concepts it raises the hope that in the final state of unification many different cultural traditions may live together and may combine different human endeavors into a new kind of balance between thought and deed, between activity and meditation.[5]

The principle of complementarity may of course be abused. It can be used as an excuse for inaction. It may be employed to palliate differences where a sharp disagreement is actually valuable in developing rival inquiries or competing solutions, whether scientific or political or economic. The atomic nature of matter is not by any means a microcosm of all activity, human and divine, though it is endlessly suggestive, as a guide to the first and a reflection of the second. It must not be thought of as the atomic scientist's panacea for all problems. But it is symptomatic in an elegant way of the resourcefulness of the modern physical sciences. It shows how far the physicist has penetrated into the mysteries of the ontological order. In conjunction with the speculations of quantum theory which developed it, the principle of complementarity reminds us, even while it fills in many of the interstices of knowledge, how little we know.

The limitations of scientific knowledge

More than most men who have contributed as much as they have to learning, the great men of science of our time are aware of their lack of learning, of how much they do not know and of how much they are never likely to know. Max Born, in a famous address on *Experiment and Theory in Physics*, neatly sums up the position of the scientist: "I believe that there is no philo-

sophical highroad in science with epistemological signposts. No, we are in a jungle and find our way by trial and error, building our road *behind* us as we proceed. We do not *find* signposts at crossroads, but our own scouts *erect* them, to help the rest." [6] The breakdown of nineteenth-century materialism, so confident of its own scientific foundation, in the face of modern science, has removed from the scientist the onerous burden of prediction, although the average man still endows the scientist with prophetic gifts that the scientist himself has long disclaimed.

The joy of prediction is not very frequently the atomic scientist's pleasure. While deeply concerned with the shape and structure of the processes he studies and works with, he can only discern some of the patterns of the past, and certainly not those of the future. Systematic behavior for the scientist is generally teleological: he can work back from phenomenon to phenomenon to describe with some accuracy a spiral of growth or of decay. But it is only from effect to cause that he can go with security. The reverse procedure is, he knows, unreliable, for in it he is never really capable of prophesying with accuracy; he can only offer a certain amount of history upon which to base confident suggestion of possibilities. But this is not to say that the modern physicist shies away from some construction of reality. On the contrary, since the development of Planck's quantum hypothesis in 1900 into the most vigorous branch of modern physical theory, physicists have been more and more concerned with the nature of matter and have presented findings to the world which have at least as much philosophical significance as they do scientific.

It no longer can be said of the scientist that there are some questions of vital importance about the nature of life that he does not ask. He asks them all. But he is wise enough at this point in the development of the sciences not to expect answers to all of

them. He has the philosophical depth to recognize that what he has uncovered in his examination of the behavior of matter—of what might be called physical events—has led to something more profound than a chronicle of process. He has learned something of the inner tensions of physical reality and has become accustomed to living with those tensions, rejecting the facile simplifications of an inflexible determinism in favor of a principle of indeterminacy and its corollary principle, that of complementarity.

By comparison with the flexibility of the atomic physicist, the views of some cosmologists seem as rigid as those of the most hopelessly dogmatic nineteenth-century materialists. Indeed, the speculations of these men about the universe and the laws that govern it may seem to the layman little more than an echo of the crusading materialism of the last century. The proponents of the "steady state" model of the universe are such cosmologists. According to them, their model is best, not only because it accords with the theory of relativity—many other models do so also—but because it "satisfies the perfect cosmological principle," as one of the most lucid of the apologists for this cosmology, D. W. Sciama, explains it. This model of the universe does so because it is "the one in which the continual creation of matter maintains the universe in a steady state despite its expansion." Steady state cosmologists are seeking a rigid theory which can account for all the behavior of nature.

> We have only one universe, so the significant fact in this case is the actual behavior of this single phenomenon. The laws of nature must thus be formulated in such a way that they relate only to the actual universe, for other universes, by definition, cannot exist. In other words, we seek a theory which describes all that actually happens, and nothing that does not, a theory in which everything that is not forbidden is compulsory.[7]

The steady state cosmologist asks, then, for a theory that accounts "in detail for the contents of the universe. To do this completely it should imply that the universe contains no accidental features whatsoever." The result is as much a self-propagating theory as it is a self-propagating universe that is sought, a theory that brings all the parts of the universe together in another Chain of Becoming. Thus one "possible linkage" instanced by Sciama is that of a pair of cosmologists, Bondi and Gold, who "begin by making the obvious point that the large-scale behavior of the universe depends on the laws of motion. They then add that, owing to the unity of the universe, the laws of motion depend on its large-scale behavior." [8] This sounds suspiciously like a circular argument, but it may be instead another example of a subject-object relationship of the mind-body kind. It may also be possible, then, that the search for self-consistency on the part of steady state cosmologists may bring them to accept some sort of principle of complementarity in the universe. This, however, seems only a remote possibility, for the philosophical outlook of steady state cosmologists is inherently positivistic and strongly set against making use of anything in their theory which is not based on direct observation. Cosmologists of other schools are more likely to investigate the applicability of the complementarity theory to their speculations, notably the proponents of the "big bang" hypothesis, who hold that the present state of the universe came about explosively at one moment in time.

One may find the positivistic rigidity of the steady state cosmologist uncomfortable; one should not, as a result, discount the solidity of his achievement or his special insight into the designed structure of the universe, however he may account (or not account) for the designing. He has glimpsed order in the universe of a magnitude that would have startled but not displeased the

great synthesizing minds of the thirteenth century, Alexander of Hales, Albertus Magnus, and St. Thomas Aquinas. His teleology of course does not and cannot reach confidently to the first mover of Aristotelian cosmology or the Supreme Being of Thomas', but it does offer him breath-taking views of the past, for with his 200-inch telescope he can see galaxies that sent forth their light perhaps seven billion years ago, and he can look forward to seeing, with radio telescopes, vistas that stretch even farther back in time. His insistence on actually observing the physical nature he studies may not in itself justify all his conclusions, but it does make them more accessible to the lay mind, perhaps, than the speculations of the atomic physicist, and in a language that is, in every sense of the word, natural, for it follows the logic of the senses. Sciama puts it this way:

> An atomic physicist studies what one might call the *typical* behavior of matter. He will tell you, for instance, how a hydrogen atom behaves in any given environment. But in his professional capacity he is not interested in the environments that hydrogen atoms actually have in the universe, or how many there are, or any other *actual* fact. All his methods and techniques are designed to study just typical behavior. On the other hand, the cosmologist is interested in what actually is the case; he is the naturalist of physics. The fact that most of the atoms in the universe are hydrogen, while only a few are heavier elements, has to be understood by him just as much as the way in which each atom behaves. Again, the fact that some of these atoms are actually concentrated in relatively small regions, namely galaxies, which have a well-defined average mass and separation, must be understood too.[9]

The cosmologist, like the observational astronomer, brings to the aid of the ordinary man a vast descriptive apparatus with which to explain what ordinary eyes see and to make the mind behind those eyes want to see more. However reliable or unreliable his account of creation may turn out to be, he has helped

to describe the shape of space, and thus to translate the large but essentially nebulous awe of the layman who confronts the visible universe into a series of quite special perceptions and thus appreciations. Since shape appears in two ways in astronomy, the layman must start by making a fundamental distinction between the geometric shape of a body in space and its dynamic shape, that is its form when in motion, its four-dimensional shape, or "shape in time." Many bodies in space appear spherical, as for example, planets and their satellites and the larger asteroids. Gravity acts as a strong enough force in these cases to prevail over other pressures and over molecular displacement. But there is much irregularity in smaller bodies and a constant yielding by the smallest and lightest particles to the pressure of energy, which produces the exquisite fantasies of the cloud theaters, in which the sun acts sometimes as curtain, sometimes as proscenium arch, but more often as the most elaborate of lighting systems.

Changes do not occur with any great speed among large clusters of stars or galaxies, but the record they present to the eye (or the telescope) has been made over millions or billions of years and hence their four-dimensional geometry is often very odd. As a result of the startling behavior of stars that burst into spectacular brightness and then fade (Novae) or others that pulsate with a more regular period (Cepheids), the history of the past that is contained in the heavens is often marked by rapidly expanding gaseous figures, some bright, some faint, called planetary nebulae because of their disc-like form. A spiral nebula is a particularly handsome sight as its trail of stars, perhaps thousands of millions of them, doubles back on itself and coils around a dark smudge near the bright center, like the great galactic cloud which obscures the brightness at the center of our own galaxy in the constellation Sagittarius.

Nothing, perhaps, in human experience comes closer to making tangible the space-time continuum in which we live than the understanding of the stars' extended history that the astronomer has given us. We recognize in their configuration some of the meaning of the famous words of Minkowski, spoken in 1908, "Space by itself and time by itself sink into the shadow and only a kind of union of the two retains self-dependence." A point does not exist in space outside of time. An event does not occur in time apart from space. There are only point-events, which exist in a four-dimensional continuum, the three dimensions of space joined irrevocably to the dimension of time, as the record of the motion of stars demonstrates to the eye. Their stability or instability in space is transmitted to us through light emissions across a period of time, in some cases, of billions of years.

There are many ways to understand this central fact of the general theory of relativity, but none that makes such immediate contact with us as this one of the stars, in which past time hangs before the eye in present space, like an exhibition of ancient portraits. But the cracks in these portraits are very rare, and more likely on close inspection to be revealed as smudges than as any real break in the surface, and the protective patina that their journey across the space-time continuum has placed on them is in general so slight that we are allowed through them the freest, fullest contact with the point-event at which they began.

Two views of reality: determinism and indeterminism

The perceptions of modern astronomers and cosmologists, like those of Einstein, to whom they are much indebted, are part of a deterministic science. Though neither materialists nor mechanists, these men are tied by strong convictions and a formidable

body of evidence to a rigid theory which bases everything on the gravitational field. With it they calculate physical history, that is point-events in the past, and with it they make radar-like sweeps of the future, of point-events to come. Theirs is, then, a different view of reality from that of the quantum physicists. They oppose to the indeterminacy principle an inflexible determinism; they are as sure of the effects of the gravitational field that they can measure and the clear continuities they have described as the quantum theorists are of the wave-particle duality or complementarity, with the marked discontinuities of the quanta.

What sort of relationship is possible between these two views of reality? Does it force upon a young scientist, for example, a choice? Does it impede progress in the physical sciences or leave the related branches of learning that must depend upon the physical sciences in a chaos of uncertainty? The relationship between the two kinds of theory has already to some extent been achieved. The formulas of quantum mechanics are certainly used by mathematicians and physicists whose bias is deterministic. And equally, the mathematics of the general theory of relativity is not only well known to quantum theorists but much used by them. In addition, as answers of sorts to the other perhaps more vexing questions, there are the grand attempts at synthesis of men like Einstein and De Broglie.

It may be that no firm synthesis will ever be possible. The rigorous determinism which apparently works in the macroscopic world may always have to be relinquished in microphysics, where chance and probability seem to reign. It may be that the principle of complementarity will be introduced successfully into the treatment of these two approaches to the natural world. What seems to be certain is that neither will have to give way entirely to the other, for within them are contained certain fundamental truths that human experience regularly and insist-

ently confirms. For a Christian they can be stated perhaps in terms of the great Pauline principle asserted in the first chapter of the Epistle to the Romans: *per visibilia ad invisibilia*—"For the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made."

It is a binary principle that works either way: we may go from the visible to the invisible or from the invisible back to the visible. The scientist draws pictures of an invisible reality and infers forces from what he sees; he also works from the constructions of a reality beyond the coarse equipment of the senses to penetrate, building upon that invisible world his more nearly complete descriptions of the world the senses confront and adding to that world the prodigious technology that rests upon his speculations. That technology now has resources which will take man far enough out into the space-time continuum to test in ways that the mind cannot altogether grasp the inferences and estimations of the cosmologist and the astronomer. The machinery with which the probing will be done, like so much of the machinery being developed for a deeper thrust into the earth and into man himself, is the practical product of the work of atomic physicists and their mathematician colleagues. The thin line that separates applied from pure science today is the complement of the faint curtain wall that just barely divides the visible from the invisible.

The extraordinary powers of ordinary men

The average man looks on, as the scientists break their boundaries, with a mixture of repulsion, awe, and satisfaction. The satisfaction comes from the creature comforts that turn up in the laboratories that decorate the edges of pure science. The repulsion comes from the recognition that the same radioactive ele-

ments that may destroy the cancers of the human body may in time turn out to be the cancers that destroy the world. The awe comes from the awareness of the power of the sciences today, destructive or constructive, a power which, like the predictions of quantum physicists, has a beginning and a history which can be described but has as yet no end in sight.

What the average man fails to see, as he is intermittently awed, repelled, and satisfied, is that he has powers not unlike the scientist's and that they begin for him—or at least may begin—every time he passes by a small plot of earth in which something grows, every time he looks up or down at a passing insect, every time he finds himself in the company of birds, dogs, caterpillars, trout, starfish, algae, mosquitos, tomatoes, potatoes, stones, grass, fungi, anything living or once alive. He may open to his senses and the spirit that gives them meaning the world of form which they are meant to perceive and to examine, to meditate upon and to understand.

6

the world of form

The sense of form

WHEN we speak of "a sense of form," we generally think of a person responding to a work of art. But form as a word, as an idea, as a study, has much larger implications than art. The embryologist Albert M. Dalcq sees form in these large terms:

Form is both deeply material and highly spiritual. It cannot exist without a material support; it cannot be properly expressed without invoking some supra-material principle. Form poses a problem which appeals to the utmost resources of our intelligence, and it affords the means which charm our sensibility and even entice us to the verge of frenzy. Form is never trivial or indifferent; it is the magic of the world.[1]

C. H. Waddington, discussing "The Character of Biological Form" in the same symposium in which Professor Dalcq's enthusiastic words appear, says:

It is hardly too much to say that the whole science of biology has its origin in the study of form. The foundations which support the

elaborate superstructure of modern experimental work—the description of living things, the anatomising of them into separate and discrete organs, and the comparison of related types which led to the development of the theory of evolution—are all essentially concerned with the shapes assumed by the living organism and its parts. Thus all biologists, in their elementary training, even if not in their later more specialised interests, have been immersed in a lore of form and spatial configuration.[2]

F. G. Gregory, discussing "Form in Plants," explains that "The appearance of symmetry is an invariable characteristic of growth whether it be of a living or non-living system; this is true both of the simpler organisms consisting of single cells and of higher organisms composed of multitudes of such cells." [3] The crystallographer S. P. F. Humphreys-Owen tells us that "The equations of Physics, derived from forces exerted on and between pieces of matter, are capable, when plotted on paper, of reproducing forms." Our senses impose form upon liquids by ignoring "the individual dance and vibration of the molecules" and substituting "their average positions instead." As for solids, their "interesting forms . . . can be traced to some regular equilibrium pattern of the molecules." [4] There are the comparatively simple sets of geometrical units of crystals, in which one form repeats itself almost indefinitely in a solid. Compared to forms in organic nature, this is a crude geometrical art, but not by any means an uninteresting one. But inorganic form and the artificial forms of the human artificer—the hardware of houses, ships, factories, cars, planes; even works of a more conscious craftsmanship or of a studied art—lack something that the naturally organic always has. The biologist Waddington explains what it is:

Organic forms develop. The flow of time is an essential component of their full nature, and the spatial object we can hold in our hands and examine, with eyes or microscope, during a short few minutes is

only a single still out of a continuous sequence of forms which continuously unfolds, sometimes quickly, sometimes more slowly, throughout the life of the organism of which it is a part. All scientific consideration of organic form must start from this point.[5]

We seem to find completeness in organic forms. There is no suggestion of unfinished work, as if something has been left out. There are no indications of a patchy job, as if the conception were somehow not clear. And the forms are not dotted or decorated with adventitious bits and pieces, fragments that obviously do not belong. There is a sense of wholeness—that really is what the word "organic" means when it is applied to a work of art or an idea—an order on the surface which reflects an order within. But the extraordinary fullness and complexity of this order can only be grasped when it is compared with that of a man-made form, mechanical or electronic in purpose. The man-made form, even when it performs such a multiplicity of duties as the modern computing machine, conceals no mysteries. Organic form translates many functions into a delicate equilibrium that only in part confronts the eye and only in part can be identified and sorted out into its working details, even by the most discriminating observer.

It is because we live with ourselves that we can identify the many functions of say our bones and our muscles and recognize in the simple articulation of the one and the elastic binding of the other a supreme adaptation of form to function. In the same way, we can recognize in the man-made objects around us effective or ineffective imitations and adaptations of human elements or additions to them, parts meant to implement and complement the human body, not merely to imitate it. But whether an ingenious replica of a hand or a leg, or an extension of it designed to add considerably to the human function, these forms

never display the range, the completeness, or the delicate balance of human shapes, or indeed of animal or plant form. They cannot help but lack the special qualities of organic form.

Having made due note of the special qualities of organic form that are manifested in human beings and particularly of their close association with function, we should perhaps be able to observe the relation between form and function in other organic forms, in plant and animal life. In actual fact, however, we have far to go in this area. There are still vast numbers of questions about organic form in animal and plant life to be answered, and indeed there are many questions still to be asked. For, perhaps because man has been too much guided by what he knows of his own body, or because he is still deeply immersed in what might be called the utilitarian epoch of history, his examination of form in other creatures has too often been directed by a concern for utility that at best may be lacking in imagination and at worst may be simple to the point of crudeness. He tends when classifying form in plants and animals to make it almost entirely a function of preservation or reproduction, connected in the case of animals with the fairly complicated quest for food or the various means used to ward off enemies or to attract the other sex, and in the case of plants with stages of growth in which the key element is the reproductive process.

This tendency is not without its value in the early classification of forms. But it often reduces our understanding of the life of a given creature to a set of categorical distinctions which are only of classificatory importance, and it separates us with something approaching finality from the larger meaning of vast areas of animal and plant life, from the special beauty and significance of creatures whose utilitarian value is apparently nil and whose sexual processes, fight for preservation, and whole machinery of growth are of very little intrinsic interest.

The science of form

In approaching the study of form in organisms—the discipline called morphology—we need some of the naïveté of Goethe, who first introduced the term "morphology" into biology in 1827. We need not, of course, make Goethe's glaring mistakes. We need not distrust apparatus of any kind as the enemy of simplicity and directness in scientific observation. We need not personify everything in nature as Goethe insisted upon doing, nor link physical processes in nature with human psychology as he did. We need not refuse the aid of mathematics as something extraneous. And surely we need not feel the urge to categorize everything seen into a collection of representations of archetypes.

But none of this is necessary to understand with Goethe the primacy of the visual in any attempt at scientific observation. We can accept the use of mathematical procedures and of any apparatus that may recommend itself as an aid in observation. But at the same time we must also accept the validity of the principle of *Anschaulichkeit*, what the biologist Sir Charles Sherrington translated in a lecture on *Goethe on Nature and on Science* as "obviousness" or "naked clarity." What Goethe seeks to describe with this nearly untranslatable term is an openness to nature in all her moods, a sense of trust even when nature is at her most destructive, a willingness to accept her quite as she is. What it amounts to is love of the kind expressed in that effusive fragment of Goethe's called *Die Natur*, Nature. The translation is Sherrington's:

We are in her and she is in us. Unasked and unwarned we are caught up by her into the whirl of her dance. She carries us along until we are tired and drop from her arms—she herself is tireless. Her present is eternity. Always is she a whole and yet never is she complete. All the time she constructs and she destroys all the time.

Life is her finest invention, and Death is her device for getting more life. She sows wants because she likes movement: The game she plays with all is a friendly game. The more one takes from her the better she is pleased. But she loves herself; her study is herself and her own pleasing. She invites us to share her own enjoyment of herself. She loves illusion. She shrouds man in mist, and she spurs him towards the light. Those who will not partake of her illusions she punishes as a tyrant would punish. Those who accept her illusions she presses to her heart. To love her is the only way to approach her. With her love-potions she can heal the woe of a life-time. She has brought me here; she will take me hence. I trust her. She will not hate her own handiwork.[6]

Love and trust like Goethe's make it possible to see the world of nature in all its wholeness, the wholeness that is life, the wholeness that is movement, the wholeness that is everlastingly generous. How it heaps colors upon the eye, textures on the skin, tastes upon the tongue, fragrances upon the nose, and sounds upon the ear!

The appeal of nature to the senses is obvious enough. But the depth of that appeal, the great underlying meanings of the symbolic forms and patterns of nature—they are not so clear at all. They will not be altogether open to the human gaze or even to the great resources of the contemplative mind until all mystery has been removed from the universe and being itself is no longer a puzzle. But enough is clear in nature, when studied lovingly, trustingly, meditatively, to engage the best of any man, and whatever is not clear offers enough for further speculation and meditation so that at no point are the intellectual or spiritual powers of a person either exhausted or frustrated. But one must realize that the approach to nature that is a mere passing through will not do. That is like reducing a great civilization to a couple of superhighways and the road signs one sees on them. Nor should one be content with a cursory examination of surfaces to

take due note of a change of season and superficial signs of growth or attrition. That is like inspecting a great painting briefly, just long enough to recognize that a man is killed in it or a woman kissed or a child held lovingly in a mother's arms, while something vaguely narrational occurs in the background.

The signifying structures of nature must be examined at least as carefully as any of man's works, never merely scanned. They must neither be reduced on the one hand to the categories of process, in a kind of parody of scientific analysis, nor treated, on the other, as a mere setting for human events, an ingratiating but not particularly significant collection of outdoor rooms in which the games of life can be played.

The contemplation of nature

Nature has its own rhetoric, the source after God of all other signification. The Germans, with their genius for joining words together, could very well call it the *Urschauspiel,* the original and ultimate spectacle. For what is joined together in nature is meaning on every level, meaning of the deepest kind, the meaning of problems that can be solved, the meaning of mysteries that cannot. Nature is strewn with a multitude of symbols of an Eden-like kind. They require in a contemplative examination at least the care we normally give to a great work of art. To fail to give them that much attention is in effect to turn one's back on Paradise, Paradise neither altogether lost nor altogether regained but shadowed forth in sometimes blatant, sometimes elusive detail.

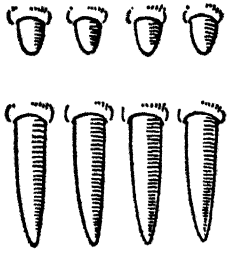
The kind of meditative study that is enjoined by nature is made admirably explicit by the Swiss biologist Adolf Portmann in his study of the appearance of animals, *Animal Forms and*

Patterns. Discussing the details of color and form on the feathers of birds, he calls attention to the asymmetry of the fragmentary darts and flakes of design on each individual feather, which look as if an artist had pulled his brush sideways, from top to bottom or bottom to top, across a wing or a breast, to touch only a small piece of exposed surface.

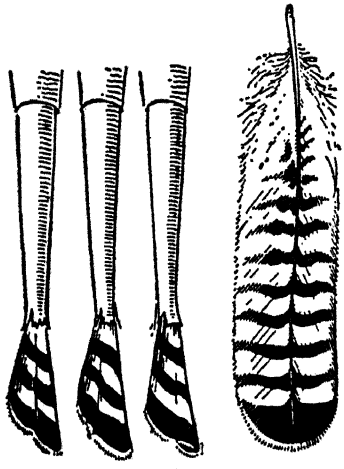
We realize the astonishing nature of such a combined pattern only when we consider that it develops inside several or many feather sheaths completely separated from one another; and that in each individual feather it appears at an early stage while it is still tightly rolled up, the joint pattern not being produced until these feathers are unfolded.[7]

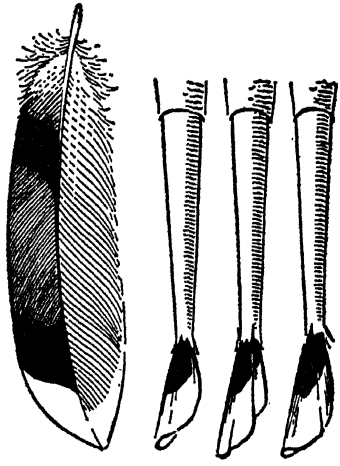
Portmann asks an important question: "What sort of unknown forces direct the constructional work in the 'painting' of these feather germs?" And that leads him to a vital set of cautions or directions on the observation of nature that are the equivalent in mid-twentieth-century terms of Goethe's early nineteenth-century effusion.

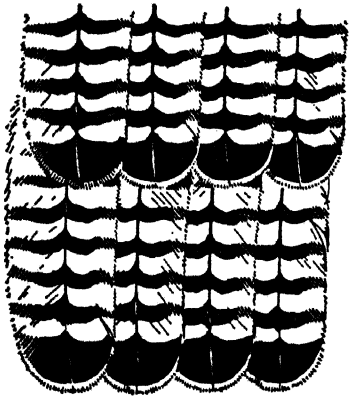
Careful observation of such feathers opens the door to a world of shapes full of indescribable delight to the eye. Once you have begun to look properly at the feathers of a partridge-coloured hen or of a duck, you have entered a completely unknown world. But to observe means to study every detail lovingly, to dwell upon these minute structures, not to be rushing from one thing to another with a hasty glance as it catches the eye, in the way that the present craze for pictures almost forces us to do, by throwing fresh masses of them in front of us every day, like fodder in a trough. What opportunities for making fresh discoveries lie ahead of those who begin to draw these lovely objects, and as soon as they do so become absorbed in their beauty, or who start a photographic collection of all its variations! Perhaps we may open up such paths if we direct attention to a few simple feathers. Intensive absorption in the forms of living things, at any point whatever, discloses unsuspected delights to the eye and opens the way to deeper insight into their significance. How many

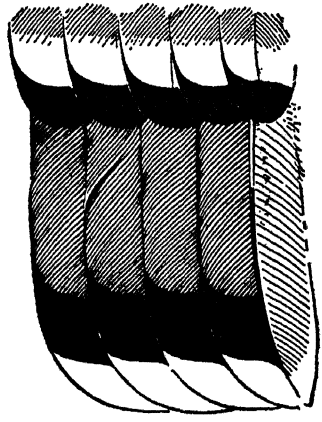


Stages of formation of birds' feathers







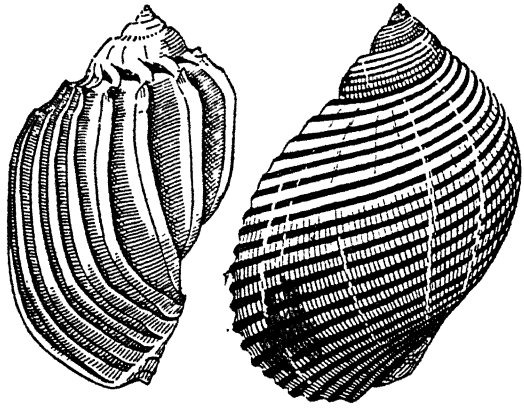


Animal Forms and Patterns—Portmann

people there are nowadays to whom life seems empty of any meaning, but to whom it would have a new and unsuspected value as a result of intercourse with the works of nature! How few people experience the delight of the eye afforded by the loving study of leaf forms in all their wealth of shapes, or of the changing colours of our plants, or the structure of seeds and fruits.[8]

The delight the eye takes either in animal or plant form is often in simple symmetries of the kind that the branch and twig patterns of trees offer or the segmentation of the lower vertebrates such as that exhibited by most kinds of fish and crustaceans. But even at this level, the eye meets an extraordinary range of design. Sea urchins, for example, show both a regular radial structure, that looks as if it had been traced by a compass, and a far more irregular pattern, in which within a bilateral form a variety of figures appear, figures not unlike the complicated traceries of an abstract artist with geometrical tastes.

There is at least as much to charm the eye among the invertebrates. The range of effects among the shells of mollusks, as Portmann shows, is elaborate and marvelously inventive. There are delicate and not so delicate variations on the spiral theme, both symmetrical and asymmetrical; some crowned by a circular drive to an apex, which acts as a brilliant break in the rhythm of the decoration; some brought to an end by the sheer momentum of the spiral design. There are shell formations that look like clenched fists, others that resemble kneaded dough; there are some concluded with marginal spines that look like nothing so much as the unframed strings of a piano or a harp. A whole schematization of design form among the mollusks can be made on the basis of the relationship between shell formation and the degree of differentiation. As the nervous system becomes more complex and sensitive in its organization, the shell begins to disappear. A kind of law of form can be expressed in terms of an



Animal Forms and Patterns—Portmann

Two variants of growth in spiral shells

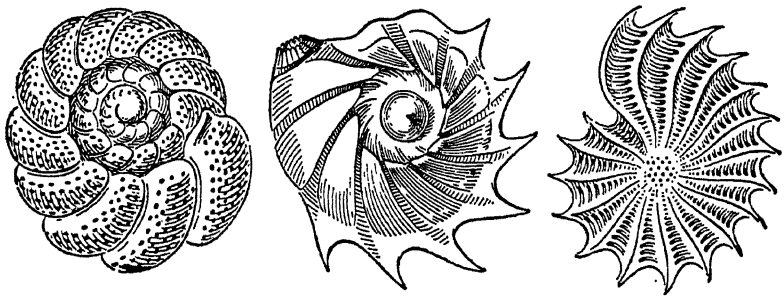
inverse proportion between outward simplicity and interior complexity.

"Nothing," as Portmann says, "points more clearly to the hidden greatness of the creative life-forces than the fact that animals with a rather simple organization can produce structures which man spontaneously compares with the works of his artistic creations." [9] And that this is not the peculiar achievement of just one particular phylum of invertebrates can be demonstrated by the examples Portmann offers of the skeletons of the Radiolarians, microscopic unicellular animals which live in the deep reaches of the sea, or the strange and wonderful constructions of the Foraminifera, another variety of one-celled marine animals, who spend their energies in the building of lime-filled rocks, or the exquisite branchings of the Bryozoa, marine moss animals who seem to be inspired in their imaginative exercises by a Japanese or Chinese painter.

One of the special concerns of those who bring an instructed eye to the viewing of nature is the extent to which design is di-

rected to the eye. Most mollusks do not look at each other, and indeed cannot; they have no means to produce images of the world around them or of each other. But some carnivorous snails have the necessary equipment to support the large eyes with which they examine their neighbors in the ocean; they surely look at each other. To what extent, then, is the design of one mollusk made for other animals to see and the design of another intended for the inspection of members of the same group? What inspires an optical effect that is neither for the purpose of camouflage or sexual attraction, and that is not designed to express mood or anything else that any observer has been able to see?

At the lowest level of animal life, Portmann points out, "the few mutual relationships between individuals are transmitted by stimuli from chemical matter." No matter how striking the forms they exhibit may be to our eyes, in their own lives they are "indifferent"; they literally make no difference to them. When they do have significance, they can be grouped into two classes: those forms that are clearly designed as signs to call attention to something or somebody, often called "sematic," and those designed



Animal Forms and Patterns—Portmann

Structure of Foraminifera, a one-celled marine animal

to hide an animal, to permit it to disappear in its surroundings, called, reasonably enough, "cryptic." Sematic forms stand out, as for example circular eye spots on the wings of butterflies or touches of pure red or blue or black and white on animals that live in a gray-brown and green environment. The patterns are vivid; they resemble, as Portmann suggests, ancient battle-standards or coats of arms.

Such production of form, with a view to its being unmistakable, has also been called the principle of the wards of a key: a special scheme is inherent in the receiving nervous organ, and the visible form produced, also inherited, fits into this like a key fits into the wards of its lock; and, as a turn of the key can lead to all kinds of different effects, so, too, the result of such signalling apparel may be the starting point for several so-called "trigger effects." Some of the combinations of such sematic signs appear to us like the hoist of flags used in signalling. This is especially true of the headgear of higher vertebrates, the picture made by a flight of some species of duck or of certain of the wading birds, as well as the colours of coral fishes.[10]

A cryptic formation is only meaningful when an animal adapts its behavior to the pattern: a fish that has markings like those of certain seaweed must float well into the weed, an insect that can merge with a leaf or a twig must assume the right position to do so.

The complexity of these problems is suggested by the appearance of sematic and cryptic forms in the same animal, as for example certain moths and grasshoppers, woodlike on the upper wings, but streaked with brilliant color underneath. In some species of birds, the female shows a cryptic form, the male a sematic, or the other way around. Some male birds with a palette of color flamboyant enough to attract any eye in their neighborhood turn pale or drab in their time of rest. But whichever way or whenever the design appears, it is clearly directed to the eye —somebody's eye, bird's, beast's, or man's.

Animal Forms and Patterns—Portmann

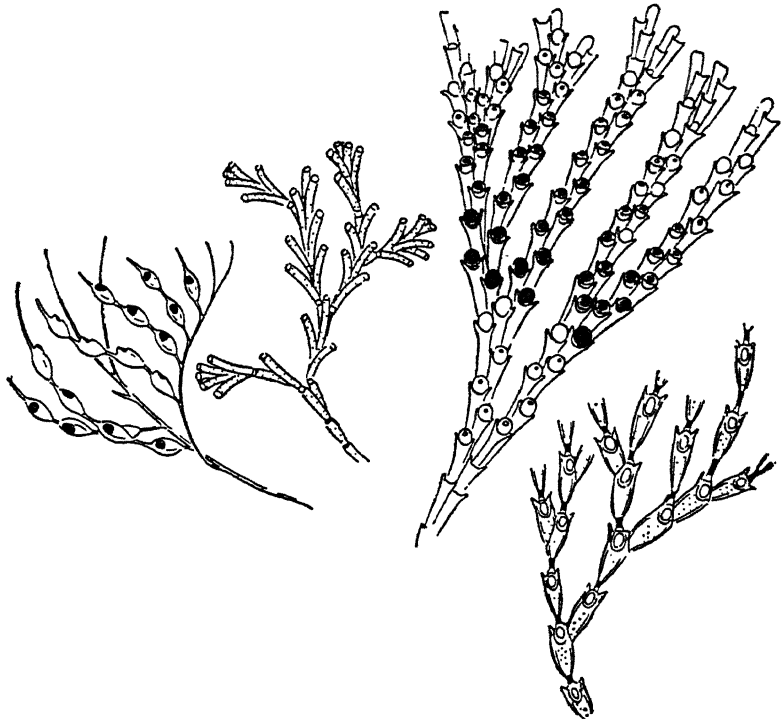
Weed-fish which lives in Sargasso Sea

A facile explanation for the appearance and disappearance of signals engraved by nature on the outside of animals is frequently made to fit evolutionary theory: these forms have developed and endured because of the principle of natural selection, which operates among all living creatures, just as animals in turn have in effect selected certain shapes or colors of flowers for preservation, or even vigorous variation, by the way they have cross-pollinated among them. But in both sets of cases, this only explains preservation—if it does that. It does not offer a cause for the origin of the forms. If we postulate some sort of directing intellect for that purpose, we still have to account for the persistence of those forms long after their selection and preservation

have been achieved. And still there remains a mysterious kind of destiny standing over color, form, and texture among creatures, creating endless variations that cannot be linked to any life process that the theory of evolution or any of the schools of morphogenesis now describe. The extraordinary range of leaf forms and shapes, for example, is utterly confounding. Function can only move a very small part of the way toward explicating their forms, organic forms, of course, but not drawn into any of the fundamental processes by anything anybody has been able to identify. The dilemma, altogether agreeable to the genuinely speculative and contemplative person, is the same for the worlds of flora and fauna. Here, as so often in this whole realm of inquiry, Portmann's summary is at once succinct and provocative:

> A feeling of the uncanny grandeur of what happens in Nature, and the recognition that the sphere of what is clear to us about the problems of life is very narrowly limited—these two prerequisites produce a very different attitude to the natural phenomena as they present themselves to us in the flowers of plants. The formation of these marvellous structures, as organs designed for visibility, is something as far from our comprehension as the development of form in the higher animals. Thus the same problems face morphological research in the botanical world as those set to zoologists.[11]

A description of animal life process that adequately accounts for what the human eye alone can see, undirected and unmediated, would have to go far beyond the present explanations of biological science. It would have to account for the production of similar patterns among many different groups of animals by very different processes—the rhythmic patterns of the zebra, certain snail shells and birds' feathers, for example. It would have to take into consideration the whole vast range of form that the eye encounters if it stands watch over any one animal from beginning to end, say the butterfly's phoenix-like life, from its first



Animal Forms and Patterns—Portmann

Plantlike growth in marine moss animals

tentative crawlings as a caterpillar to its brief but majestic life on the wing. Few transformations in Ovid are more arresting than the metamorphoses of dragonflies from larvae below the surfaces of pools or the mutations of the "late larvae" crustaceans, whose transparent ends develop in the open sea into pine-needle forms that extend from them like a prodigious growth of crystals on a chandelier.

Much has been said and much will be said about the adaptation of certain forms for sexual purposes, especially among the

higher animals. The movement of the testes from far within the body cavity to a position of prominence in the anal region, encased in a scrotal sac, seems to correspond, interestingly enough, with a double action, historical and sexual both. The place in the body of the testes has some clear relation to the age of an animal: if within the cavity, the chances are the animal is ancient; if outside and close to the anus, the animal is likely to be of more recent origin. Similarly, the most prominent display of the scrotal sac is made on the bodies of animals of high rank which have both a sexual pole that is highly decorated and predominant and a well-developed optical sense. But no functional description of the place of the testes has thus far accounted for this range of form and development. Necessity can explain very little of the process. Subtle social and psychological values seem to be involved in the place and association of this organ. "The gonads in their final position, within the conspicuous external scrotal sac," Portmann writes, "belong to the same groups of morphological structures as the antlers of deer in all their exuberance of form, or the mane of a lion. They are part of the way in which the special quality of the high-ranking animal forms is represented; they belong to the many organs through which a high-ranking organism expresses its intrinsic worth." [12]

The intrinsic worth of animals is high and not to be measured by any simple system of values. Mood in an animal is, as even the least sensitive owner of pets knows, remarkably various and far more deep-seated than any elementary theory of process can suggest. To reduce all the brilliant gradations of form that changes of mood bring in an animal to the maneuvers of a beast intent on preserving itself or to the instinctive apparatus of sexual play is much like translating all the outer effects of a human baby into the activity of the infant's stomach. There is some kind of structured response to the world in the animal that present

analysis and theory cannot account for but that the eye sees and knows exists. The element of consciousness is not that of a human being. An activity of the will, like that of man, is not behind a deceiving or cozening animal. But there is no doubt that something happens within an animal practising deception or dissimulation that is far more complex than anything we have in the past realized in our science. There is something more to be said about the interiority of animals, even if it must be restricted to a deeper searching of their organs of expression and their manifest effect upon their external forms, colors, and shapes.

The mere saying is difficult for a biologist. More than other scientists he must deal with a concatenation of facts, feelings, and circumstances, stimuli and responses. He himself responds in simultaneities rather than in straight lines of thought in which sensory reactions and speculative ideas follow each other in an orderly sequence. The essential difficulty, just to begin with, is that words will not perform like notes in a counterpoint, although nature itself does behave this way, as Agnes Arber makes clear by means of a quotation from the eighteenth-century Swiss biologist Haller in a chapter on "The Biologist and the Written Word" in her book *The Mind and the Eye:* "Nature has linked her kinds into a net, not into a chain; men are incapable of following anything but a chain, since they cannot express in words more than one thing at a time." Intuitions must be expressed in a language of arbitrary symbols and arrangements, which, no matter how great the ingenuity of the writer, cannot really duplicate the process by which he came to make his biological finding. He cannot make his reports over into living creatures, as, Mrs. Arber points out, Dante does with his odes when he personifies them or as "Imaginative writers" as a whole do when they are convinced, as they sometimes are, "that what they have penned has developed an independent vitality of its own." [13]

It is a pity that the biologist is so restricted in his writing, for certainly of all writers he has the greatest excuse to attempt anything that will give his records organic form, since it is organic form he is trying somehow to get onto paper. Sometimes the immediacy and simplicity of his translation of laboratory experiment or other observation and speculation into verbal forms give him what he wants, and even more, a directness of communication that the style-conscious litterateur cannot achieve just because he is so burdened with an awareness of the richness and capriciousness of words. The biologist has an admirable honesty, as indeed all true scholars have, in his rigorous citation of authorities. He does not appropriate another man's work, nor even the commas and other literary pauses within it. He works, fitfully perhaps, clumsily it may be, with all sorts of restrictions, to achieve lucidity, but not to the point of such a simplification that the truth is truncated and the reader deceived into accepting as real what is no more than a digest of a finding, as poor a substitute for the original work of the scientist as food is for the original dish after certain enzymes have been at work on it.

If biology is in the very largest sense of the word *"intelligible* (though not *explicable* in physicochemical terms)," Mrs. Arber sums up, "what we require is a notion of explanation which has a greater richness of content than one which has been prearranged for the inanimate." She chances a "personal opinion" that provides the biologist with a net to find and a net to throw over his finds with all sorts of connections to his special interest, and no kind of relationship that is involved in biological growth and form altogether neglected. The italics, it should be added, are Mrs. Arber's own: *"the biological explanation of a phenomenon is the discovery of its own intrinsic place in a nexus of relations, extending indefinitely in all directions. To explain it is to see it simultaneously in its full individuality (as a whole in it-*

self), and in its subordinate position (as one element in a larger whole)." [14]

The biologist must draw his nexus of relations not only from the simultaneity of facts which any life process always is, but also from the sense of growth patterns and changes which anyone who deals with the organic inevitably must have. He looks forward much of the time by looking backward. Sometimes he reaches into the past, like a historian and like a physical scientist, trying to measure the future with the only reliable tool he has, the record of what has happened to an organism or group of organisms. But far more often than the cosmologist or other determinists of the physical or physicochemical sciences, he is concerned not with predictive measurements of what is to come, but with accurate descriptions of what has been or what still is. There is enough that is elusive in the complicated world of relationships around him, "extending indefinitely in all directions," as Mrs. Arber says, to tax his powers as an observer and a transcriber. And since scientific truth, even more clearly than other kinds of truth, is constantly undergoing change, even as one examines and reports upon it, the scientist-writer is called upon for a range of skills that only a very few possess.

There are no ultimate tests with which to check scientific truths, except those of an inflexible theory, which, as so many attempts at constructing one have shown in the past, can never be more than short-lived. And even while it is accepted, it is consistent only with itself, offering the scientist a somewhat arbitrary system within which to conduct his experiments and speculations and the nonscientist a convenient resting place for his thoughts, a small and not altogether reliable hold onto a ledge of reality not unlike the grasp a mountaineer's axe permits him as he climbs up a wall of rock. Correspondences and coherences are his grasp on truth, some long-lived, some of very short dura-

tion. The element of the synthetic in this sort of approach disappears only when the scientist, by some perception that transcends description, succeeds to the understanding of the man of wisdom, the true philosopher. Mrs. Arber in describing this soaring experience quotes William Blake—"Truth can never be told so as to be understood, and not be believ'd"—and Plotinus' declaration that "the veritable truth is consistent not with an alien Reality, but with itself; it affirms nothing other than itself; it *is*, and what it is, that it affirms. How then might such truth be 'tested'? . . . For there can be found no Reality truer than the truth." [15]

The illative sense and science

The self-consistent truth of Plotinus, or of Spinoza, who said that truth was its own standard, is not the tight little system of some scientists, a system bordering on the tautological. It is, rather, the result of intuition and information, combining in effect the highest powers of deduction and induction. Mrs. Arber's illustrations of this grasp of reality understandably enough move from poetry and philosophy to the passages in Newman's *Grammar of Assent* in which he outlines what he calls the illative sense. She does not quote Newman; her references are clear enough. But for the fullest understanding of this distinction, which sets off the great men of science from lesser scientists, just as it does saints from men of ordinary goodness, it is worth going to Newman himself, who in this kind of perception has not been improved upon.

"This is the mode," Newman defines the illative, "in which we ordinarily reason, dealing with things directly, and as they stand, one by one, in the concrete, with an intrinsic and personal

power, not a conscious adoption of an artificial instrument or expedient. . . ." A peasant may display it. So may a physician. "When it is characterized by precision, subtlety, promptitude, and truth, it is of course a gift and a rarity. . . ." As an example of genius, he offers Isaac Newton's "perception of truths mathematical and physical, though proof was absent." And again, "Such is the gift of the calculating boys who now and then make their appearance, who seem to have certain short cuts to conclusions which they cannot explain to themselves. Some are said to have been able to determine off-hand what numbers are prime —numbers, I think, up to seven places." In his own sphere, Napoleon was able to interpret events and make decisions "truly" and also "apparently without any ratiocinative media." In the same way, a religious genius "affords us an instance of this spontaneous perception of truth in the province of revealed doctrine." [16] Such a genius was Mother Margaret Hallahan, foundress of a congregation of Dominican nuns and a contemporary of Newman's. He quotes from a biography of Mother Hallahan:

> Her firm faith was so vivid in its character, that it was almost like an intuition of the entire prospect of revealed truth. Let an error against faith be concealed under expressions however abstruse, and her sure instinct found it out. I have tried this experiment repeatedly. She might not be able to separate the heresy by analysis, but she saw, and felt, and suffered from its presence.[17]

Significantly enough for this discussion, Newman also quotes Sir Walter Scott on a kind of presence of mind, a divination of danger, in this case that of one of his romantic heroines, who is said to have had "an instinctive apprehension that all was not right—a feeling in the human mind allied perhaps to that sense of danger which animals exhibit when placed in the vicinity of the natural enemies of their race, and which makes birds cower when the hawk is in the air, and beasts tremble when the

tiger is abroad in the desert." All this Newman wisely compares with "Newton's rule for ascertaining the imaginary roots of equations," as a newspaper account in his day put it: "This rule has been a Gordian-knot among algebraists for the last century and a half. The proof being wanting, authors became ashamed at length of advancing a proposition, the evidence for which rested in no other foundation than belief in Newton's sagacity." [18]

But scientists must work with no assurance of the sudden illuminations which the illative power may provide. And even when the power is unmistakably present, they must continue to depend as well upon accretions of facts and demonstrations. To expect the sudden flash to take the place of fact and demonstration is not, of course, to follow the procedures of science at all, but to turn to something far removed from scholarship of any quality. When an intuition is genuine, it comes as a stroke of destiny, unifying that strange network of not quite clearly related parts to which the biologist in particular devotes himself and making it possible to see in his work itself, just as in the world he studies, that sense of wholeness and order which the term organic form denotes.

Waiting for the great illumination, the biologist must continue to work with perceptions of a more prosaic character and must depend upon a long established and altogether familiar set of investigative procedures to turn them up. But here he has the comfort of an ancient maxim of his discipline: ontogeny recapitulates phylogeny—the life of the individual traces all over again the life of the race. Because he is working with living materials he can look forward with some confidence to the unifying effect of organic form in his own work, all the more as it corresponds with the historical development of his science. Mrs. Arber's presentation of the way scientific language develops

indicates something of the whole process of development of a scientific idea and experimental procedure. It shows that curious and really quite engaging mixture of the rational and the irrational—or at least nonrational—which she emphasizes so much in her whole description of the way the biologist accumulates knowledge.

Man's first observations of natural things cannot but have been couched in his primitive current vocabulary. Then, as the scientific outlook was gradually extended and defined, a technical terminology became a necessity, and thus the subject entered on a phase in which it ceased to be "understanding of the people"; but this was merely transitional. When the language, in which science finds expression, is incomprehensible except to the initiated, it is a sign that the mode of thought is not yet at the maximum. By the time the subject reaches its high-tide mark, its largest generalizations transcend technical limits, and can again find expression in common speech: "The wheel is come full circle." We may perhaps detect a symbolic parallel to this rhythm in the stages of initiation described for Zen Buddhism. Before a man tries to understand Zen, mountains are mountains to him, and waters are waters. Then, when he is gaining insight through intensive study, mountains cease to be mountains and waters to be waters; but at the last, when the aspirant has reached the goal and is at rest, he sees mountains again as mountains and waters as waters. In such a sequence as this, and also in the growth of scientific language, words gradually shed the cramping limitations of the phase succeeding the novitiate, and gain significantly in depth. Thus "mountains" and "waters" mean incomparably more at the end than at the start.[19]

7

from the surface to the depths

MRS. ARBER'S recourse to the mystical doctrines of Zen Buddhism is instructive and cautionary. It suggests that the process by which the aspirant to scientific knowledge moves from the surface to the depths must never be so overpowered by the mechanical phases of the process that he loses sight of what the process is for. He must not find more allure in the recondite vocabulary he uses than in what it describes, trying to demonstrate each time he uses the obscure technical terms of his science that he is in possession of the philosopher's stone. Nor must he find the depths so entrancing that he forgets the surface. The Zen Buddhist initiate who has discovered for the second time that mountains are mountains and waters are waters, having moved in his contemplation of reality far beyond their surface shapes only to return, when he has achieved his greatest depth, to their outer forms once more, has the deepest importance for scientist and nonscientist alike. This is the way we learn about the world around us. We come back again always to our starting position, to the objects that first exposed our minds to a particular line of meditation, just as St. Teresa of Avila and so many other saints,

no matter how far their acts of meditation and contemplation take them from the materials of their first religious exercises, always return to the fundamental reality of the words of the Our Father and the Hail Mary.

The literal importance of surfaces has never been more clear than in the investigation of form, animal form, plant form, the form of the heavens and the form of the particles of inorganic matter, the form of objects in the macroscopic world and in the microscopic order. Our understanding of the surfaces of things is, ironically enough, superficial. We are content to read outer markings entirely in terms of some inner activity that can be named and classified. Having learned so much more of the inside of things—especially living creatures—than of the outside, we are content to reduce the visible form to a generally crude, occasionally fine, manifestation of a concealed but not at all mysterious reality.

One form of sophistication has bred another of naïveté. Because our science, itself so deeply immured in process and function, has been so intent on discovering process and function, it has lost its original sensitivity to the world around it. It does not observe surface phenomena with anything like the keenness which made its first insights possible, and as a result it has not developed as far beyond the limits of bias and rigid theory as, by the terms of its own existence, it should have. Thus the life sciences must now understand, as Portmann insists, with ample evidence to justify his insistence, that "morphological features have a form value which cannot be understood either as a function of preservation or as structures for manifesting changes in mood." What this form value shows us is "the special nature of each particular organism." That nature, special to the point of individuality in a living substance, is manifest in externals. To disregard it is often to lose the key element of a creature and

much of the identifying structure of a species. Portmann cites two significant descriptions of this meaning of appearance, his own—he calls it the "presentation value"—and that of the Dutch animal psychologist and physiologist Buytendijk—"displayed existential value." Both terms "are intended to draw attention to an essential meaning of the outward form which has only too often been overlooked as we sought for immediately vital functions." Biologists try "to show this presentation value in detail, going beyond the very general statement of correlation between organic form and degree of differentiation." How far will they be able to go in this direction? Portmann's suspicion, expressed with great formal tact, is that "with this statement we are approaching the limit of what can be said; and to recognize that it is so, is also one of the duties of the research worker. For indeed it is only at this limit of what can be scientifically expressed that the special nature of an animal form is revealed." [1]

The place of mystery

We are left at the end of Portmann's investigation with a mystery, in the same way, really, as we are left with a mystery at the present end of quantum theory, in the speculations of scientists in the tradition of Einstein seeking a unified field theory, or even in the books and papers of steady state cosmologists who are certain that they will eventually produce a systematic explanation of the unity of the universe which will take into consideration all the contents of the universe and will not be upset by accidents of any kind. "It sounds strange," Portmann suggests, "when we say that natural science leads to a world of mystery. Our Western mentality in its pride has devoted all its efforts to what is predictable and to the complete removal of the element

of mystery." [2] But the element of mystery remains. More than that, it increases with every substantial addition to knowledge and to the techniques with which knowledge is developed and applied.

Some minds, confronted by the tangle of uncertainties, translate it into a principle of a dimension somewhat smaller than the indeterminacy principle. They apply to the situation a kind of scientific surrealism, in which fantasy is allowed to rule as an antic substitute for and opponent of the computing mentality which so often in our time has threatened to make of science a low-grade mathematical game. For them, the difficulties are best explained as the results of capricious chance, the fantastic operations of an irrational nature. Unfortunately, the direction of such thinking is merely antithetical to that of the calculators and no more likely to reduce the mystery or to provide scientists with a useful working procedure. Furthermore, the mystery is not susceptible to the probings of any system of values so exclusively weighted in one direction or another. Once again we are required to invoke the principle of complementarity and to realize a delicate balance of attitudes and techniques in our approach to science. We must be content, finally, with partial insights and with findings that teach us only that we have reached "the limit of what can be said."

None of this is to reduce the size or significance of our experience. It is, on the contrary, like all scientific perceptions, based on a great weight of evidence, secured experimentally. It can be confirmed not only by the scientist's observations and speculations, but by our own. One need not be a specialist to perceive how much is locked behind forms, and even to penetrate into some of the fascinating material thus concealed, and still to realize how utterly inexpressible much of what is there suggested must always be. Portmann's moving conclusion is that "by an

extraordinary reversal of attitude, we should turn our minds inwards so that we may have a chance of recognizing a far more comprehensive reality behind our experience." Because so many people are so far from this recognition, he must, he says, "press the point that learning more of Nature must also lead us to a world of mystery." [3]

We must make the fullest and deepest recognition of what is meant by mystery, too. We are not dealing with the detective's kind of conundrum that can be solved, nor are we merely looking for the kind of entertainment that comes from having secrets revealed to us by a gossipy friend. We cannot say of this world of mystery that it is not known, expecting therefore someday to have it fully explored for us and to be given a map of the territory, as the dedicated determinist expects in time, with the development of the right theory and the necessary machinery, to be able to write a full-scale geography of the atom. We must be prepared to deal with nature with something like reverence, but not that of the pantheist or the mere admirer of function and process. Research into animal form "should ultimately lead us," according to Portmann, to an "inner experience." We will find ourselves "regarding the animal with a strong emotion, in which there is something of the astonishment of a child at work." We will look at "plants and animals with amazement or horror, with joy, but also with awe." Why? For several profound reasons:

We are not confronted with creatures whose essential nature we shall understand fully the day after tomorrow, nor yet after several years or indeed scores of years. All around us are forms of life, small or large, in which have been realized other possibilities of existence than those found in our own lives.

At times, the sight of these organic forms makes us feel as if we are faced with the uncanny materialization of our dream life, the products of our fantasy. Let us take this misgiving very seriously—not, however, as a scientific result, but rather would we see in it a

sign that the unknown is at work around us as well as within us. Today as never before the creative artist pays attention to the interplay of those hidden workings within us. He allows himself to be more strongly moved by them than at any previous time. Not without reason has such an artist perceived in the astounding nature of living forms something which seems at times to be like the bonds of a brotherhood, albeit one which it is difficult to grasp. This experience provides the certainty that organisms present us with a mystery related to that of our own special quality of life; that through their forms our senses can recognize a special kind of existence which to varying degrees and in varying ways reveals to us something of their inwardness.[4]

The place of religion

The temptation of the theist confronted with such eloquence in the service of mystery is to announce boldly that it is the same old mystery and that all that science has accomplished after its centuries of huffing and puffing is to have blown its own house down. And in a sense the theist who yields to the temptation is both right and wrong. The mystery is the mystery of being, and science and scientists, like all disciplines and all who work in them, have come up against it solidly and not moved through it, for all the confidence of nineteenth-century materialists that this was a problem to be solved in the laboratories and that the solution was imminent. But to regard the performances of the modern sciences as just so many metaphysical demonstrations is to show a remarkable dullness in the face of reality and to reduce stunning feats of the scientific imagination to a set of schoolroom exercises.

What the metaphysician can say after sixty years of quantum mechanics and almost as many lived in the light of the general

theory of relativity is that nothing in modern physics disproves the existence of God. He can add that all the evidence in the biological sciences, and all that has not turned up, requires the honest investigator to say with some firmness as well as some frequency that his inquiries have led him again and again to a world of mystery. And having said all of this he will be forced to admit that he has only asserted, as scientists themselves only assert, principles of impotence, saying what cannot be done rather than what can be. This in itself should be cause for rejoicing, however. It may clear the air of the noisome odors and rude sounds which for so long have accompanied the debate between science and religion, one of the most artificial of all verbal conflicts, one of the most poorly conducted, and inevitably therefore one of the least fruitful.

It is undoubtedly true that the course of nature presents to the observant mind untold examples of a design superior to any conceived by man, of a resourcefulness more various and adroit in its responses to emergencies than anything ever shown by man, of an imaginative power larger than any demonstrated by man, and all joined in a scheme of such depth that no procedure known to man has yet done more than tease a few random revelations from it. It is equally true that the course of science constantly offers to the mind evidence of the reasoned skill of man in dealing with this difficult environment, this puzzling and potent environment, which can match all its marvels with malignancies and all its clarities with confusions. Together the two courses may approximate that subtle balance of revelation and reason which for the Christian best describes the equipment given man to guide him through a fallen state to a state of blessedness. But approximate is all they can do. For God's revelation through nature is remote and hedged around with all the

marks of disharmony, if not chaos, which made so many of the Fathers believe that it was not only man that fell in the first great act of disobedience, but also nature, whose fruit offered man a convenient means of displaying his refractoriness.

God's primary revelation is not through nature. The religion constructed by men who worship God solely because of what they see of Him in nature is apt to be a pantheism full of self-contradictions and empty of personality. A Christian inevitably recoils from it. But many Christians do turn to nature for evidence of their religion, and indeed frequently base a whole apologetic upon it. None do so quite as eagerly as those Christian rationalists who have become apprehensive about the grounds for their faith in ordinary human experience or who have grown timid about their religion as a result of what they believe to be the contrary claims of science. They are considerably aided in their apologetic exercises by the large number of scientists who have written treatises defending the faith, bringing a battery of witnesses from the sciences to the defense. But God is not on trial, nor are Christian believers. The protestation of the scientific validity of Christian beliefs, or more, of proof from the sciences of that validity, no matter how scholarly the argument and packed with laboratory demonstration, will only stir the suspicion of a less than secure faith. Furthermore it is self-evident that the God whose existence can be demonstrated in a laboratory requires no faith.

Science and apologetics

An apologetics based on scientific evidence is a nervous one. It is constantly scanning the works of physicists, chemists, biolo-

gists, astronomers, physiologists, geneticists, every kind of scientist, looking for proof, proof positive or proof negative, and more often than not proof that the scientist in question had never realized he was offering. Every indication that a mathematician or mathematical physicist, a cosmologist or astronomer can make of order and constancy in the universe is eagerly seized upon as further proof of the argument from design, even though the scientist whose works are being raked for theist evidence is a confirmed materialist who is just as confident that what he has been doing and saying is evidence for his dogma as the theist is that it is evidence for his. When a biologist such as Sir Charles Sherrington describes the development of cells in man and comments that it "is as if an immanent principle inspired each cell with knowledge for the carrying out of a design," the apologist pounces, happy to have found still another witness, this time to the immanent God, reduced it is true to the size of a tiny "step in one or other great thousand-linked chain process," [5] but unmistakably and solemnly proclaimed by nature and science, working triumphantly together.

This sort of apologetics can be as quickly unseated by science as it has been established by it. In the rich maze of modern mathematics upon which so much of scientific explanation rests today, there is a vast variancy of facts discovered under its sway. What is found today may have to be scrapped tomorrow. The finding may always be valid as part of a hypothesis, meaningful as one step in a self-contained system. But the premise upon which the whole system is erected may have to be re-examined and in time may be tossed aside as either no longer applicable to events or as a false description. Much of the time, the scientist is of necessity a formalist in the very narrow sense of the word, not so much concerned about finding a permanent content for his proposi-

tions as he is about discovering workable forms for each new investigation. He may quite properly regard as irrelevant or devious or naïve the interpretation put on his statements by the overeager Christian apologist. For many scientists, the best way of describing scientific laws is such a one as that of the philosopher of science R. B. Braithwaite.

Braithwaite defines the function of a scientific law as

> just exactly that of organizing our empirical knowledge so as to give both intellectual satisfaction and power to predict the unknown. The nature of scientific laws cannot be created independently of their function within a deductive system. The world is not made up of empirical facts with the addition of the laws of nature: what we call the laws of nature are conceptual devices by which we organize our empirical knowledge and predict the future. From this point of view any general hypothesis whose consequences are confirmed by experience is a valuable intellectual device; and the profitable use of such a hypothesis does not presuppose that it will not at some future time be subsumed under some more general hypothesis in a more widely applicable deductive system, nor that the facts which it explains will not some time be explicable by a quite different hypothesis in another deductive system.[6]

The Christian apologist working in science is too often faulty in his arithmetic. He fails to take into account the enormous distance from God at which the things observed by scientists rest in nature and the even greater distance at which their observations are made. When a teleology is constructed from the effects found in nature, ending in the uncaused cause which is God, what an enormous chain has to be stretched from effects to causes, and what a large number of links remains to be found! One does not often discover God that way or even rediscover Him, but only a meretricious argument which a skillful scientist can cut to pieces.

It is no wonder that Laplace, the early nineteenth-century astronomer and mathematician, scorned the "hypothesis" of God in scientific reasoning and that so many of our contemporaries working in the sciences tell us that nothing in their experience with earth or with heaven, with the human body or anything else in nature reveals God to them.

There is, after all, no particular approach to the brain cells or to spiral nebulae, to microscopic particles of light or the flowers that bloom in the spring that is certain to bring the investigator to the majestic Being who to the man of faith is patent in all these things. Quite the contrary, really. The scientist who looks for God at the bottom of his test tubes is much more likely to end up with a jagged retort than to find Him. The immanent God is not present in creation in anything like so palpable a way; if atoms are playful about their location and cannot be isolated at any point-event in the space-time continuum, how much more remote from the probings of apparatus must God be!

Atoms are infinitesimally small. God is infinite spirit. What scientific process ever can hold Him in its net? And similarly, what telescope, no matter how powerful, can find Him behind the mirrored light of multibillion year antiquity? What mind that has dwelt on God really expects to move through space to get beyond it to wherever it is that the transcendent deity transcends? Transcendence and immanence as attributes of God do not describe either a presence or an absence that a scientist's measurement can reach. They are, like all the terms we use to talk of God, only analogies designed to give us some small notion of what His Being is like. Small as that notion is, however, it is gigantic when compared with the notion of the apologist who reduces God to the dimensions of a laboratory matter and in the very act of affirming Him denies Him by clothing Him in the apparel of mutability.

Science and religion

Science can do much for religion. It has already done a great deal. It has removed forever from our minds the crude imaginings of an afterlife lived in regions luxurious or loathsome, but regions merely antipodal in direction to the earth in which we spend this life and intrinsically no different in texture. Purgatory, even for the purposes of allegory, can no longer be located at the other side of the world, just opposite to Jerusalem; hell cannot be found in the alternately fiery and frigid bowels of the earth; and except for the child just beginning to grasp after eternity, heaven no longer hangs suspended from the stars. Our conceptions of a life to come, while by no means divorced from a physical reality, are in part because of science much larger than the dimensions of this planet.

Science has taught us something even more important: not to depend upon science. Its many changes and multiple reversals of position over the centuries have made it abundantly clear that to tie a religious position to a scientific theory is to achieve only the shortest life for that position. Only transcendent conceptions, so transcendent that they participate in some not quite describable way in an other-worldly reality, can survive the ferris-wheel motions of science and the assault of new discoveries. Science, fortunately, is not all of one impulse. There are more than briefly tenable findings in the scientist's notebooks. From the first there have been those astonishing minds, philosophers or scientists or both, who have in some way conceived the existence of transcendent truth, of a world of reality not subject to any of the hindrances of growth or decay.

Science is not, then, antipathetic to religion. If it does not always justify the extravagant claims of the religious apologist, neither does it justify those of the materialist apologist, who has

made random findings and short-term hypotheses into creeds. The assertions of both sets of apologists vulgarize the accomplishments and experiences of science by making them do a duty they were never designed to do. Both force the scientist into the strait jacket of polemic, making him take a position in an ill-conceived debate for which he most often is ill-prepared. Both make much smaller the reality that the scientist seeks to encounter. Science versus religion? An unreal battle. A shameful waste of space-time and of mass and energy, and more logically at this point the occupation of schoolboys testing the powers of their new-found knowledge, flexing their intellectual muscles, than the concentration of grown men.

It is delightful to find the most reasonable statement of the balance that science and religion must find together in the writings of an ardent materialist and one of the most heated controversialists of our time, Julian Huxley. In his introduction to *The Phenomenon of Man,* that book by Pierre Teilhard de Chardin that is itself the subject of much controversy of this sort, Huxley celebrates Père Teilhard's achievement and uses it as an opportunity to talk about these two vital approaches to reality:

His influence on the world's thinking is bound to be important. Through his combination of wide scientific knowledge with deep religious feeling and a rigorous sense of values, he has forced theologians to view their ideas in the new perspective of evolution, and scientists to see the spiritual implications of their knowledge. He has both clarified and unified our vision of reality. In the light of that new comprehension, it is no longer possible to maintain that science and religion must operate in thought-tight compartments or concern separate sectors of life; they are both relevant to the whole of human existence. The religiously-minded can no longer turn their backs upon the natural world, or seek escape from its imperfections in a supernatural world; nor can the materialistically-minded deny importance to spiritual experience and religious feeling.

He praises Père Teilhard's refusal to "take refuge in abstractions or generalities" and his resolute facing of "the specific realities of man's present situation, though set against the more general realities of long-term evolution . . ." For Huxley, the particular accomplishment of the Jesuit paleontologist was a more acute definition of man's nature and the evolutionary process and an optimistic one. The evolutionary process viewed this way is "anti-entropic": it runs "counter to the second law of thermodynamics with its degradation of energy and its tendency to uniformity." [7]

Whatever the merits of Père Teilhard's system, which is more a thesis in teleology than a scientific theory, it does have the special merit of being altogether hopeful, even in the face of every human hostility and all the evils in the universe—to use his terms, the evils of disorder and failure, of decomposition, of solitude and anxiety, and of growth. He calls us to order, to "the *irreversible coherence* of all that exists." He asks us to recognize an extraordinary new understanding of life. Modern man, having experienced a prodigious growth in consciousness, can, if he will, see the transformation in the world which his own metamorphosis has helped to bring about. He can discern the great change from a fragmented world to a coherent one:

> First the concatenations of life and, soon after, those of matter. The least molecule is, in nature and in position, a function of the whole sidereal process, and the least of the protozoa is structurally so knit into the web of life that, such is the hypothesis, its existence cannot be annihilated without *ipso facto* undoing the whole network of the biosphere. The *distribution, succession and solidarity of objects are born from their concrescence in a common genesis.* Time and space are organically joined again so as to weave, together, the stuff of the universe. That is the point we have reached and how we perceive things today.[8]

This may be too simplified a view of the interrelations of all the substances of creation, as some scientists have suggested. It is not, however, unbalanced in the way it moves from the material of one science to that of another and then out of science altogether into the realm of religion, for everything in the experience of modern science indicates that sharp distinctions between the physicochemical disciplines and the biological are meaningless in the face of reality. And Père Teilhard's view is not too simple in its joyous acceptance of all of life, from the smallest particle in the microscopic order to the heaviest body in the macroscopic, for everything in modern science tells us this too, that the coexistence which the politicians are always talking about must start with the universe. The essential complementarity is of man and nature, with all that we know of both and all that we shall in future learn, and all that we shall never know and cannot ever learn. Chance confirms it. Providence affirms it.

PART III

THE RESPONSE OF ART

8

art and sanctity

CAN an artist paint a picture of sanctity? Can a composer translate it into sound? Is there a true poetry of holiness, such that the mere reading or hearing of it assures us that we are in touch with some form of ultimate reality?

We have seen pictures of saints and countless paintings of Jesus and Mary and Joseph. From them we have gathered our images of certain holy men, St. Francis, St. Augustine, St. Sebastian, Sts. Peter and Paul, images more firmly fixed than they should be: the first two a little seasick in their gaze up to heaven; Sebastian shot through with arrows but looking serene in spite of the transformation of his body into Swiss cheese; Peter usually lugging a couple of enormous keys or a fish; Paul halfway off his horse on the road to Damascus or carrying a sword as emblematic of his apostolic fervor. We have over the years made Mary into the reigning beauty of popular taste of each century, ending with the smirking face perfected by Hollywood, in which emptiness is relieved only by artificial eyelashes, plucked eyebrows, two lipstick wounds and a matching pair of cheek-rouge lacerations: the conception is not immaculate. Joseph is condemned to a similar inanity today, but he is spared the excesses of utter vacuity out of

respect for his age: he has grown with the centuries, if not in wisdom, then at least in its badge, a long, long, long beard—artists more and more tend to confuse him with Methuselah. As for Jesus, the blasphemous images that go by that holy name are not pleasant to recall; it is enough to remind ourselves that in most of them his sex is still not determinate and the divinity of his person is expressed by a glazed stare into distant outer space.

Composers have done rather better by the Holy Family and the saints, perhaps because they have so often depended on sacred texts which have not only the hallowing of tradition to recommend them, but in almost every language an incomparable cadence that demands music. And even in our time, when third-rate minds have been so confident of their ability to present a satisfactory image of God made Man and of His Mother and father, the incursions of popular song in this territory have been happily rare.

Bad religious poetry is endemic in the West, and has been for more than half a millennium. But it hardly floods the popular press or even the unpopular, and the serious meditations of sensitive and talented writers are still so much a part of literature that to complain about their accomplishment is only to proclaim one's own ingratitude.

The reflections of the poets and the continence of the composers do not answer our questions, however. They offer evidence only of a continuing interest in sanctity as a subject and of a prevailing good taste among certain craftsmen. The witness of the popular artist, furthermore, is to such a degradation of his craft and of public taste, that one might very well, under the impetus of that example, want to drop the whole inquiry as a clear waste of time and an unnecessary form of self-punishment. There is far more to it, fortunately, than these performances indicate. There is a whole world of art, remote from the public gaze or

distorted in it, in which work of high consequence for any examination of these questions is being done. There, in half a dozen arts or more, such chasteness of purpose, if not clarity of achievement, is being displayed that one can understand the fervor of Huysmans' tribute, "Art is the only clean thing on earth, except holiness."

Art and abstraction

The art of the twentieth century is abstract art, which is not simply one kind of painting but every sort of art of a certain texture, music, ballet, poetry, drama, architecture, sculpture. Abstract art dominates this time so thoroughly that it has filtered through the double curtain of bias that separates intellectuals from the rest of the world and has begun to influence the tastes of masses of people. But it remains a puzzle to millions too, and not only to the uninstructed. While the philistine attacks on that curious compound that goes by the collective name of "modern art" have almost ceased, the lack of understanding and sympathy that those attacks betokened is still very much with us. There is something less than certainty abroad about the quality of the contemporary arts. The communication lines between artists and nonartists are even less well established than those between scientists and nonscientists, and the suspicion that the layman has not only of the work but of the intentions of arts and artists in our time more than challenges in intensity the unfriendliness he feels toward the sciences.

For more than a century now artists have been associated with a revolutionary way of life. They have lived apart from the mob since long before the nineteenth century, but the romantic movement and its several successors, especially in France, established

as a firm part of folklore in the West the artist's way of life. First there was the artist's quarter in the big city: odd. Then there was the artist's morality in town or country: odder. One supported and gave identity to the other. From the two emerged the artist himself, a strange figure, wild in his dress and not altogether clean, given to gestures, grimaces, and a way of speech that ordinary people either could not or would not understand. Even today, when the morality of the artist is no different from the mob's, and his dress, not to speak of his social habits, has been adopted by almost everybody, the artist remains a man apart. He is still suspect. For though he is himself no longer so strange as he used to be, his art is stranger than ever.

The strangeness of art in our time is to be explained by many things which for the sake of convenience we group under the heading of abstract. But "abstract" here means anything and everything, including the furiously concrete. It is as most people understand the word a fuzzy one to use to describe so many different kinds of art. But it is not altogether an inaccurate term. Abstract art is in one sense a withdrawal from the world, eliciting from objects something that cannot always, or even often, be identified as the objects themselves. It is not concerned with that re-presentation of things which was for so long the currency of art and its badge of respectability and honor. Rather than a catalogue of objects, art has become a ceaseless dialogue with being. Artists no longer have a social function but a philosophical one. Looking at a thing today, many artists will try to capture the "thing-in-itself" in words or colors or sounds, in concrete or steel or glass. Essences intrigue the artist. In his effort to get at them, he constantly draws away from the concrete or tries to lift the surface or surfaces from an object to get at the core beneath. That activity, however the artist goes at it, in whatever art, inevitably elicits the response "abstract" from both the trained and the untutored mind alike.

The movement toward the abstract in painting started with the experiments of the impressionists and postimpressionists. They were aware with varying degrees of concentration and information of the scientific revolution of their time, the second half of the nineteenth century. It coincided happily with the revolution in art, which removed from the artist the shackles of professionalism that threatened to turn him into a tamed monkey performing in a salon. The artist moved out-of-doors at the same time that the new understanding of optics made clear that color was a function of light. Monet and Renoir splashed colors across their canvases with a freedom no artist had ever felt before and allowed the spectator to act as his own arbiter of light. They found scenes to fit their experimental ideas and militant antisalon bias: bathers, boaters, café-dwellers. As this understanding of form and content developed to the point almost of a new academicism, a new group of painters pushed beyond it. They were even more absorbed with form than the first impressionists. They recognized that painting, like music, could properly turn form into content, that there was in fact a much deeper content to be found in painting forms than in painting the race horses and dancers, the drinkers and harlots and other exotics with whom their predecessors had been so much concerned. Landscapes had much more to reveal than the arch of trees' branches or the perspective of roads disappearing in a misty twilight. For all the suggestiveness of a foggy seascape, it was a limited subject; it did not go much beyond a superficial dream-state as content, and as an investigation of form it revealed very little that a hundred other exercises in the vagaries of light had not already shown.

GEORGES SEURAT

Georges Seurat did not live long enough to develop his conceptions beyond a first few process-tortured performances, but how impressive those spectacles of atomized light are, in which color

is divided into its constituents and then put together again, atom by atom, dot by dot. The whirling pin points of Seurat's paintings sometimes make it difficult to look long at any one of them, as the geometrical silhouettes into which he assembled them sometimes so weary the eye that it turns for comfort to anything that can promise irregularity of line. One is intensely aware all the time of Seurat's theories in his practice. But since theories presented this way obviously have a warmth that verbalization could never have, and since theory was Seurat's fixation and at least as much his concern to communicate as the subject matter of any of his paintings, his pointillist pictures may be accounted a great success.

Seurat was looking for a module for painting, a unit of design with which any aspect of reality could be translated from the world of objects onto canvas. He searched scientifically, and, when he found what he thought satisfied his requirements, a point of color at the end of a brush that was the visual equivalent of the molecular structures physicists were discovering and after a fashion describing, he applied his discovery with a systematic thoroughness that closely resembles a scientist's application of a hypothesis, unit by unit, experiment by experiment.

PAUL CÉZANNE

In the same way, Paul Cézanne reduced the world of Provence, indoors and outdoors, to geometrical forms. The cylinder and the cone, the cube and the sphere were for him the essential components of space. But they did not confront the painter's eye in their simplest forms; they emerged as color values, as planes and volumes of light that had to be retraced from subject to subject, from apple to apple, from tree to tree, and up and down and across one branch, one mountain, one rooftop, one bather. He

studied form as a morphologist does. And like the best of morphologists, he became more and more absorbed in form until he found himself trying to express the inexpressible. His paintings move in an upward arc, from the late 1870's until his death in 1906, closer and closer to the summit of abstraction. Color-forms dissolve object-forms. The point of interest is more and more geometrical, but the paintings as a result are not any more monotonous. The painter has made his brush strokes into surrogates for the eye: they search out form in the smallest segment of an object: a patch of light on skin, human or fruit, dissolves flesh into geometry; a multitude of patches, light and dark and many-colored, restores humanity and the apple. To see how much Cézanne accomplished in these paintings, one must be willing to work away at the surfaces of his canvases as he worked away at the objects that sat for him and in front of which he sat so long: mountains and trees, rocks and houses, fruit and smock-covered people. This is another revelation of form like those commended by Portmann, and like them quite open to the inspection of the human eye, but like them too it requires concentration, perhaps of a grueling kind. Then it will yield its mystery, or if not, at least that awareness of the unknown and of a reality larger and more satisfying than ordinary life which in the description of the mystical life is called a secondary consolation.

The reality of the object

Art does have rewards, and they are not as different in kind from those of the religious life as the language used to describe them often suggests. The so-called aesthetic experience, if it means anything, means this. There are not dozens of different kinds of reality to which each of the disciplines is an avenue.

There are many approaches. But there is only one reality. Since it is simple and immutable, it cannot be broken up into many parts. Because it is infinite, it can never be encompassed, by any method, by any science, by any art; it cannot even be described; it can only be approached. Approached by man, who is everything that a transcendent reality is not—mutable, complex, finite—it breeds every kind of frustration. It seems to hold man off, and with every eager intense effort he makes, it replies with a more baffling counterthrust, sending him back to try again, weaker this time, more frustrated than ever, but also perhaps a little wiser, not so certain he can attack and capture reality. The record of painting in our time is a narrative of such thrusts and frustrations, of the madness of painters who have not known quite what they were doing or why and who have become madder with each failure, and of the sanity of a few who have been serenely aware of their actions and where they were leading or were not and who have become more serene with each frustration.

VINCENT VAN GOGH

The suicidal spiral of one great movement toward reality seems to start around the head of Vincent Van Gogh and to move furiously across the day into the streets of Arles with him, into the houses and billiard parlors, and out into the night again. It is matched, if not in intensity of personal unhappiness, then at least in awareness of the misery of others, by the German expressionists soon afterward, and then, many years later, by the American abstract expressionists. But there is in Van Gogh some of the alternative serenity too, though it is more distant from the viewer's eye and more mute. It is usually the contribution of an inanimate object, and among inanimate objects most frequently

a chair. It is very much a part of the paintings of his last years. It is in the chair that holds Madame Ginoux ("L'Arlésienne"), herself a reflective figure if not an unperturbed one; it is in the chairs that give anchorage to Postman Roulin and his wife ("La Berceuse") and hold both compositions still for a moment. It is most eloquent in Van Gogh's portrait of a chair in a corner of his room, in which every stroke of the painter's brush has been directed to an allegory of meditation. But the contemplative element can only be understood by an answering movement on the part of the spectator. The chair must be meditated upon at length. Then Van Gogh's point of concentration may be measured by the spectator, even if he cannot duplicate it. He may feel the presence of that chair as the painter did, and before it may experience some of the awe that is in Van Gogh's painting of inanimate objects. The wonder is evoked by being, being reduced to the proportions of a chair or a table or a light hanging from a ceiling in a billiard parlor. The wonder is not lessened by the commonplaceness of the objects that evoke it. The fact that something *is*, and that someone witnesses its existence is enough. Each confirms the other's existence: the thing and the person, the object and the subject. And each has a presence, in both great spheres of matter, space and time. Each of Van Gogh's paintings memorializes a point-event in the space-time continuum, because more than most painters Van Gogh suffers being to exist in his paintings. He literally feels the fields and trees, sun and moon, rooms and furniture, perhaps feels them too much, joins too intensely with them in their experiences of storm and heat, in their support of the misery and folly of people in the agony of being. The value-judgment is not important. Painting changed with Van Gogh, moved farther away from a mere mirroring of objects and closer to a penetration of them.

KANDINSKY, KLEE AND OTHERS

The violence of Van Gogh's objects may bother some people, but they will always have the advantage of being objects. They may behave as if possessed by demons, but their outlines are familiar. One recognizes them. And similarly, one continues to pick out people and things in the work of the early expressionists and the *fauvistes* and the cubists, though one may have to work a little harder to pluck the front page of *Figaro,* a wine bottle and a mandolin from the cubist compositions or to make sense out of the horror stories that the expressionist Emil Nolde makes of saints' lives. It is when all resemblance to the object seems to disappear, with the compositions of Kandinsky and Klee and with the exclusive devotion to line of the Dutch group, *De Stijl,* that serious difficulties enter for the viewer. He can no longer look at paintings as he does at cartoons in the newspapers or at films or at billboards. But he need not be dismayed. The more superficial qualities of these movements have made their way so thoroughly into advertising art that most people are used to seeing an imbalance of black lines on a white or yellow background suddenly righted by a square of red, or two-dimensional figures, heavy with flat head, hopping around with the gleeful anti-anatomical motion of a child's drawing. As a result of such translations of Mondrian and Klee and others, and the immensely popular museums of modern art, modern art has lost its terrors. Its flora and fauna have become familiar.

One may predict as much again for the abstract painters of the last generation. They seem to some not to be painters at all, but only slashers of canvas, throwing gallons of paint at acres of canvas, or letting it drip on. They are figures of fun made to order for *New Yorker* and *Punch* cartoonists, and for film farceurs. But even if only through the exaggerations and distortions of farce, they will become familiar too and in time will end up in picture-

postcard reproduction and large-scale facsimile on the walls of young married people's homes. They will pass, as so much abstract art must, into the innocuous realm of decoration. But not for everybody. There will be some who will recognize in the strenuous painting of these men (whose muscles must be more sorely exercised than any painter's since Tintoretto spread huge canvases all around the walls of one house in Venice) a genuine kind of meditation. Either they will find it directly, in the color spilling in such immense quantities over their paintings, or indirectly, through the painters' words.

A philosophy of the object

The words of the abstract expressionists command at least a second look at their paintings. If some of what the words promise is in the paintings, then the viewer will find something much larger than the concern for process which, on the surface at least, seems to be the most significant energizer of painters in our time. James Brooks asks for judgment of a kind: "There is no more forthright a declaration, and no shorter path to man's richness, nakedness and poverty than the painting he does. Nothing can be hidden on its flat surfaces—the least private as well as the most personal of worlds." It is not only a battle with form: "An engrossment in the process of changing formal relations is the painter's method of relieving his self-consciousness as he approaches the mystery he hopes for." That mystery—Brooks also calls it "the unknown" and "this strange thing"—may be evoked by "natural growth or forms" or "man-made things." Adolph Gottlieb talks of the "problem of projecting intangible and elusive images that seem to me to have meaning in terms of feeling." He cannot identify what it is that the images "mean": "This

is simply the wrong question . . . A better question would be, 'Do these images convey any emotional truth?' " But this question must be answered with paintings, not with words. "Demands for communication are both presumptuous and irrelevant," says Clyfford Still. "The observer usually will see what his fears and hopes and learning teach him to see. But if he can escape these demands that hold up a mirror to himself, then perhaps some of the implications of the work may be felt." [1]

Another of this group, Franz Kline, explains simply enough: "If you're a painter, you're not alone. There's no way to be alone. You think and you care and you're with all the people who care, including the young people who don't know they do yet." Painting for him is not a way of knowing, but of giving: "You paint the way you have to in order to *give*, that's life itself, and someone will look and say it is the product of knowing, but it has nothing to do with knowing. . . . When you've finished giving, the look surprises you as well as anyone else. . . ." That concern for the ethical is not Kline's alone. Robert Motherwell says, "I believe that painters' judgments of painting are first ethical, then aesthetic, the aesthetic judgments flowing from an ethical context. . . ." Using Kierkegaard as a source for his own judgments of value, he finds in the work of modern painters a mixture of accomplishments which for him establish its ethical texture: "Venturesomeness . . . integrity, sensuality, sensitivity, knowingness, passion, dedication, sincerity . . ." It is all, he says, "a question of consciousness . . . Without ethical consciousness, a painter is only a decorator." And the audience is restricted in the same way without it; it is "only sensual, one of aesthetes." [2]

The artist of today, having persevered through a long apprenticeship to process, has begun to approach a much larger reality. He has learned much from the modular searches of Seurat and Cézanne and the translation of the turbulence of matter into

pigment by Van Gogh. He has watched attentively as circles and rectangles have been investigated exhaustively and lines explored restlessly by painters with a predilection for the geometrical. He has watched the gradual absorption into the painter's world first of paper, then of glass, wood, iron, and plastics, adding texture or dimension, as the painter demanded. He has been challenged by the experiments of Ladislaus Moholy-Nagy, whose imagination refused to recognize any limits made merely by the materials or processes conventionally associated with painting, and who was able to demonstrate the suitability of almost every medium to the art. With Moholy-Nagy the investigation into the resources of light for the painter came to a logical end. He made light itself the subject and object, ends and means, both, of a kind of painting, by exposing a sensitized photographic plate to different intensities and directions of light. Now he has taken all these techniques and all their accompanying perceptions and jammed them back into his paints and onto his canvas. Tricks of light and oddments of texture are produced once again by means of the brush or at least the paint itself. Paint is the painter's most satisfactory material, although he is certainly not affianced to it by any doctrinaire declaration.

The point of paint is explained by a painter a full generation removed from the first abstract expressionists, Richard Lytle. "Within the process of painting," this young artist says, "universes wait unexplored. The quest for these worlds has led painters to seek plastic relationships which transcend the historical concept of subject matter and which glorify the possibilities of color." Another painter of this generation, Robert Rauschenberg, says, "Any incentive to paint is as good as any other. There is no poor subject . . . A canvas is never empty." Color is a means which has become an end; any object, any thing has the potentialities of a work of art. What matters is a sense of presence. The

sculptor Richard Stankiewicz, who uses scrap iron and bits of steel to make his meditative fantasies, is entirely aware of the philosophical significance of such work:

Things may be objectively present without having the affective power that we call "presence." The extraordinary object, the one with presence, is one which is subjectively and tyrannically there: it can no more be ignored than being stared at can. It seems to me that this charged quality of things is what a work must have to be sculpture and any technical means for achieving it is allowable. It is the ultimate realism, this presence, having nothing to do with resemblances to "nature." The peculiar posture of the convincing being, the stance of being about to move, the enormity of the immovable, the tension between the separate parts of a whole are qualities that pull us to the special object like iron to a magnet. And these beings of presence that we try to make—they are models of a never quite credible existence.[8]

A sense of the present

Stankiewicz' language is remarkably like that of the Catholic philosophers Gabriel Marcel and Louis Lavelle who recognize, in Lavelle's words, that "The present is the fundamental character of being." In it the eternal is concretized. If "these beings of presence" that the artist tries to create are, as Stankiewicz says, "models of a never quite credible existence," may it not be because in them something eternal has been expressed?

The artist is aware of something larger and more lasting than finitude. And he is also conscious of the short-lived nature of his awareness: the permanent can be felt only in the least lasting of temporal dimensions, the present. There, somewhere between "the stance of being about to move" and "the enormity of the immovable," he finds presence, as a man in prayer does too. "Reli-

gious thought," Marcel wrote in his *Metaphysical Journal* at the end of 1920, "is only exercised on the present." Only the present can hold the substance of prayer. "If I ask myself whether my prayer has in fact been heard it is no longer of a *prayer* that I am thinking—I am only thinking of a step I have taken with regard to some kind of prayer." Prayer is not accountable to description. There is no past or future in prayer: "the religious soul *knows no precedents.* The religious soul is forever calling everything back into question; there is no such thing as an established possession—and this is only an indirect way of defining hope." [4] Religious life finds its unity in a series of experiences of this kind, which are really submissions to God's will. But they must be free, made without any sense of predetermination, either on man's part or God's, otherwise they cease to be submissions of the will and become instead regimentations.

The artist, turning to things around him, if only to his paints and brushes and canvas, or to iron and steel, seeks the same sort of presence. He is responding to the moment and trying to draw from it all that the moment can contain, or at least all that his equipment permits him to take from it. The response may take hours, days, months. If it takes long enough, it may involve a complicated kind of recollection like that of a zealous formalist in prayer, who goes through certain set exercises each time, in anticipation of the freeing that the disciplinary preface may permit. That continual re-establishment of the beckoning present is probably the best way to account for the return of a painter to the same exercise again and again, to lines examined in tic-tac-toe structure or in more complex networks, to one or two stubby lines painted down seven or eight feet of canvas, to drippings produced by variously quick or slow promenades across an unstretched canvas tacked on the floor, to tempera gathered in great megaliths of color across canvas or paper, to elegant little

figures scampering around an amorphous environment in apparently meaningless motion and color, not unlike the strange beings that inhabit photographs of nerves or cross-sections of brain tissue. Each time the painter returns to his familiar line or dripping, megalith or particle, he is summoning presence again, with the only sure means he has, the equivalent of composition of place or even resolution in the methodologies of prayer.

However strange or farfetched it may seem to an outsider, every line in the geometry of the abstract painter, all his splashes and squeezings and swipes across the canvas, are his joyous and sorrowful and glorious mysteries. "One can believe in paintings," the abstract painter Bradley Walker Tomlin said, "as one can believe in miracles, for paintings, like miracles, possess an inner logic which is inescapable." But that logic is only inside the painting, once done. The artist is not likely, working with the same lines, the same calligraphy, the same buckets of paint, the same grade of canvas, on the same sort of afternoon, in the same studio, after the same meal, to produce a work of the same quality. "Does the artist find," Tomlin asks, "that the seemingly effortless structure, which he has evolved with total clarity, tends on repetition to escape him? That in spite of the production of masterpieces, art itself remains infinitely mysterious . . ." [5]

A sense of presence

The lowest moments of an artist can be turned into art, too, even those moments when he is most full of self-doubt, doubt about his own resources, those of his own craft, and of the art itself. Even those moments of what Marcel calls "inner indigence," in which "being reaches its lowest ebb or ceases to offer resistance to itself," even those have the matter of art in them, as they, supremely, have in them the energy of prayer. For just

because at this point, as Marcel puts it, "all other persons are treated as others" and "even the *I* sees itself as *him*," just because one is so divorced from presence, one can reach out after it. In this "nostalgic state of the soul," it is possible to do more than whimper after a lost experience; one can develop a new experience, a new experience of presence, of self-presence, and thus a new work of art, with its own inescapable inner logic.

Marcel asks himself in his diary, "May not happiness be a form of *self-presence?* The more I am present to myself, the more others exist for me. This is an example of the interior undividedness to which I referred when writing of the will—it is that which makes the will possible." And so he defines the activity of the will: "To will is to succeed in avoiding self-division before performing an action." In the metaphysical sense of the word, then, there is no ill will: "Will is in itself a good. An act is good inasmuch as it is willed." And a further speculation a day later leads Marcel to ask himself "whether the operation of the will is not fundamentally bound up with the possession of a sort of grace," and to state in very concise terms exactly what he is doing as a philosopher: "The fundamental datum of all metaphysical reflection is that I am a being who is not transparent to himself, that is to say, my being is to me a mystery. It is only in moments of interior ebb . . . that I cease to apprehend myself in this way." When he is at such a low point, he makes clear in a footnote, he seems to himself to be reflecting in a void: "I am not this particular state, and hence this state is at bottom nothing. But I am not anything else either; hence there only *is* this particular state which itself is nothing. The formula of theoretical despair and pessimism is a forefeeling that there is no appeal or recourse." [6]

The painter dedicated to presence often finds his work vacillating between the clear act of will that Marcel describes and the reflection in a void. He may not be able to verbalize this wavering

across the fields of hope and despair, but he can paint it or construct it in metal. Some of the vast planes of emptiness with which contemporary painters have presented us are remarkably clear records of inner indigence. And equally, some of them, just a hairsbreadth away from the other canvases, capture the essence of a willed reflection on the obtuseness of being. A painter, like a philosopher, must face the possibility, even the probability, of despair. It is one of the ways he knows himself and thus his craft. "Only by chancing the ridiculous," a young San Francisco artist, J. De Feo, puts it, "can I hope for the sublime. Only by discovering that which is true within myself, can I hope to be understood by others." [7]

The religious object

The ridiculous has been chanced with particular courage in the religious painting of our time, though it is hard to say just who has shown more courage, the painters or their patrons. When artists like Matisse and Léger have accepted commissions to do churches, they have endangered their good standing in the secular community. Those who have commissioned them have run the risk of dwindling congregations and diminishing collections. Fortunately, the results more than justify the risks.

FERNAND LÉGER

Léger's series of windows at Audincourt, wrapped like a great ribbon around the church, call attention in vivid color and striking form to the instruments of the Crucifixion. Seventeen rectangles are filled with the bulbous shapes characteristic of Léger. They are no less evocative of the events with which they are associated because they are charged with a personal style.

They are protected from any dissipation of tension which is so often the fate of the mysteries when they are reduced to the conventional treatment of a literal-minded artist. For what we have here are in effect the nuclei of the Gospel narratives of the Passion rather than their precise outlines. The windows have a kind of stylized resemblance to the cells of the human body, presented in cross-section—not an infelicitous way of offering the life of Christ to the contemplation of the senses of the body and of the soul. The meditative mind inevitably responds to such stimuli.

HENRI MATISSE

There is more of the flesh in Henri Matisse's Chapel of the Rosary at Vence. The modes are still suggestive, rather than representational, but there is no mistaking the shape of people and the outline of events in the handsomely decorated tiles which go together to make up Matisse's murals. Faces remain blank, however; features are the viewer's to fill in. One stands in this environment as a contemplative collaborator of the artist, who has opened lines of meditation but not closed any. The sun of southern France filters through a richness of ornament and an openness of narration: flowers, leaves, a few stylized patterns frame the church—all of it designed by the painter—and cut up the grillwork on the doors which separate the Dominican nuns from those who come to pray or assist at Mass. A series of iconographic insinuations cover the Stations of the Cross, brought together all on one wall, to force those making them to a new kind of attention, a stationary kind.

LE CORBUSIER AND ROUAULT

There is a playful element in Le Corbusier's Chapel of Notre-Dame-du-Haut at Ronchamp. Some may be offended by it; more will be entertained. The light is not so bright here, on top of a

breadloaf hill in the Vosges, as it is in Vence, but the imagination shines spectacularly through the wild variety of windows, windows of random widths and random shapes and a unified beauty. The windows are set far into the walls, counterthrusts in their random movement across the façade to the roof that floats like a great crazy dome over the very minimum of supports. The impression of floating is deepened by the slender band of light that separates the roof from the wall. Life in this church is, if not all joy, at least always celebratory. Nothing is taken for granted, nothing treated as it is in any other church in the world, except the rubrics which dictate the place of the altar and related arrangements. One may turn away from Notre-Dame-du-Haut in disgust or bewilderment; one cannot forget it; inside it, one cannot remain insensible to its provocations.

A similar fullness of incitation is in all of the works of Georges Rouault. The massive lines, thicker than any others drawn around objects in the painting of our time, thicker even than those of his fellow *fauviste* Maurice Vlaminck, frame whores, judges, devils, angels, the Virgin, Christ and His persecutors. To these thick-lipped, heavy-limbed, crudely articulated figures one responds violently. It is hard to meet the rage of Rouault's brush with tenderness or delicacy. But one must be careful not to make the violence always one of anger or despondency or outrage. There is a violence of joy too, and Rouault cultivated it alongside the cries of havoc. He joyed in pigments, in textures, in the substances he used and the substances he tried to capture; he reveled in matter. Especially is this clear in his last paintings, in which the heavy laminations of color extend right across the canvas onto the frames. Here he has found his own joyous world of abstraction, not untouched by recognizable figures—a face, some fruit, a tree, the sun—but not confined to or even concentrated upon things at all. For what Rouault really found was his own

basic unit of painting: the large brush stroke. He had amplified several hundred times the dots of Seurat. He greeted with each stroke the miracle of creation. Less and less as he grew older did he have time in his paintings to deplore. More and more he painted, in his vast and tumultuous enlargements of matter, his simple profound wonderment, not at the way that things look, but at the fact that things look at all.

ALFRED MANESSIER

Rouault's was never a facile pessimism; in transformation, it did not become a glib optimism. If he had translated his thought into a clearly defined philosophical position, it might very well have resembled that of Alfred Manessier, who calls the direction of his kind of art "Tragic Optimism." Manessier has rejected what he calls the insensitivities of those artists who greet modern science as a source of personal comfort and happiness—the optimists; and, equally, he has turned from the artists of despair, of absolute refusal to find anything in the world acceptable—the sneering pessimists. The direction he has chosen is "for those who proclaim the importance of heart and love in this world. . . ."

Manessier's paintings sometimes have, like those of Rouault, a stained-glass effect, though the lines are always much finer than those of the older man, the colors more delicately applied, the forms more carefully outlined. In painting an "Alleluia," a "Magnificat of Harvests," or the "Morning Star," he follows no representational pattern, except perhaps the bars of the Cross, which one may imagine at once imprisoning and freeing creation in Manessier's reading of it. To say that his art is "nonobjective" is to use a foolish word to say little. There are objects in his world and hence in his painting—as there must be in everybody's paintings, no matter how inept. But objects can be scrutinized

differently, understood differently, represented differently by different artists. When the themes are abstract, Manessier's variations upon them are abstract: that is the only way to make concrete the meaning of an Alleluia or a Magnificat. But he is not driven by any creed of abstraction to remove any traces of a recognizable spiny object from his treatment of the Crown of Thorns. In his "Veronica," the lines have an unmistakable resemblance to the lines revealed by X-ray in the shroud of Turin. And in his ebullient "Games in the Snow," the silhouetted outlines of sleds and stocking-capped little boys are the delightful exclamation points of the painting of a child's world by a father who has looked far into it.

The general direction of Manessier's painting is not representational. It would be a serious mistake to spend all one's time looking for the objects with which his paintings may have started. One would miss then the center of his work, his great "thirst for harmony and unity," as he himself puts it, an effort to move up again to a self, which has to be "reconstructed step by step," to move "towards the lost world of grace." The attitude, the words, and the painting all go together very well. They support and sustain the only realism worthy of the name in modern art, a realism compounded of interior, not exterior, values.

9

evaluating abstraction

THE VIEWER of abstract paintings must suspend his commercial values, just for a moment at least, or else he will not see what is in them. He must not spend all of his time before the canvas reflecting on the injustice of an eight-foot by seven-foot painting of three red lines on a dark-brown ground earning a large fee for a painter, or the scandal of anyone buying a painting of white on white, much less a museum. If he does, he will himself purchase only injustice and scandal. He will be so full of the commerce of painting that there will be no room in him for the painting itself.

There is an equal danger in trying to pass absolute aesthetic judgments on these paintings and painters. What standards can one use? Shall one compare the violent lines of De Kooning's snarling women to Titian's Venus or his "Sacred and Profane Love"? Will one make more sense of Morris Graves's birds of the inner eye by finding a rank for them somewhere in the list of great allegories of the contemplative life by El Greco, Zurbaran, and Ribera? Will the piston rings and iron filings of recent sculpture say more to us or less if we judge them by the same standards that we use for Michelangelo and Donatello?

There are judgments that can be made of paintings, though they are not the glib ones, either of philistine condemnation or of modish adulation. They cannot be made wholly in terms of painting either, however desirable such judgments might be: almost every attempt to hold the examination of abstract painting in recent years to the language of the art has resulted in elaborate circumlocutions which are at best only a verbal tour de force and at worst an embarrassing sort of polysyllabic gibberish.

One understands in the face of such criticism the plaint of the representational artist that his abstract rivals have not been subject to standards of criticism, that everything abstract has been wildly praised and broadly accepted, that nothing in the genre has been rejected. But the fact is that the only judgments that can sort out one painting from another in this field are judgments more of a philosophical and perhaps even a theological nature than of an aesthetic kind. After the necessary distinctions about the size of the canvas and the color range of the painting and the direction of the drippings or the flow of the paint and the size and structure of the forms, their compactness or diffuseness, how much more can be said about the volatile expressions of such painters? They are highly personal statements. They approach the universal, but through a very particular consciousness, and one must tackle that consciousness on its own terms before what it offers of the universal can be gathered from it. For the more successful a painter has been in his lunges after self-presence, the more elusive his paintings will be. Like the "interior undividedness" of the mystic, the surfaces of his works will be hermetically sealed from many viewers.

Only those already accomplished in their own dialogue with being, or those well along the way to this kind of summoning of presence, will respond quickly, easily, and imaginatively to these imageless pictures. One cannot be merely curious or critical about

these paintings; one must be contemplative. As a result of a contemplative examination of one of these works, one may reject it as an uncomfortable product of that inner indigence of which Marcel speaks, or find that for want of craftsmanship or even of taste no communication has been made. One may or may not be right, but one will have attempted to deal with the work on its own terms and to have gathered from it what it can yield as distinguished from paintings painted at other times by painters in other traditions.

The special quality that such a judgment has is not only that it is of a philosophical nature. It is a judgment of judgment itself. One is brought by the contemplation of art of this kind to confront art and ourselves all at once. Whether one responds to these paintings with deep sympathy or an antipathy as strong, one responds ultimately to value itself: first of all to the values of light and color, to the texture values, to the form values, then to the values that are involved in all art, and especially those that bring order to our experiences and sort out for us the intuitions that otherwise seem to elude us. This is the function, of course, of all art, not simply of the abstract painters of our time, but it may be that they have come more directly to their work than previous artists. The spiral of development in painting having lifted them so far from the photographic representation of the object, they were early freed to contemplate the inner meaning of the object, the thing-in-itself, and to make some judgment about its value both in itself and to them. They passed from value to value until they were dealing with value bare. Now anyone who follows their experiences may move even more quickly to the direct contemplation of value—painting value, ethical value, the value of being.

The contemplation of these paintings will not yield a vicarious experience to the spectator. It is very hard to throw oneself

into a field of red or to become one with pothooks of green and white or to lead the life of a calligraphy each line of which is twelve inches thick. One cannot really retreat from oneself into the world of abstract art as one may into a film or television drama or a novel. One cannot play at these states of being. One cannot achieve through the means of these paintings that nearly total divorce from reality which seems to be the reason most people turn to art, or at least what passes for art in their fantasy-ridden lives. These new forms of expression lead far from the vicarious and avoid the susceptibility to fantasy that is normal to visual art by refusing to dramatize experience in terms of picture narratives. As the philosopher Max Scheler says of specially gifted poets, artists of this kind "fulfill a far higher function than that of giving noble and beautiful expression to their experiences and thereby making them recognizable to the [spectator], by reference to his own past experience in this kind." The new forms of art

soar above the prevailing network of ideas in which our experience is confined, as it were, by ordinary language; they enable the rest of us to *see*, for the first time, in our own experience, something which may answer to these new and richer forms of expression, and by so doing they actually *extend* the scope of our *possible* self-awareness. They effect a real enlargement of the kingdom of the mind and make new discoveries, as it were, within that kingdom. It is they who open up new branches and channels in our apprehension of the stream and thereby show us for the first time *what* we are experiencing. That is indeed the mission of all true arts: not to reproduce what is already given (which would be superfluous), not to create something in pure play of subjective fancy (which can only be transitory and must necessarily be a matter of complete indifference to other people), but to press forward into the whole of the external world *and* the soul, to see and communicate those objective realities within it which rule and convention have hitherto concealed. The history of art may be seen, therefore, as a series of expeditions

against the intuitable world, within and without, to subdue it for our comprehension; and that for a kind of comprehension which no science could ever provide. An emotion, for example, which everyone can now perceive in himself, must once have been wrested by some "poet" from the fearful inarticulacy of our inner life for this clear perception of it to be possible: just as in commerce things (such as tea, coffee, pepper, salt, etc.), which were once luxuries, are nowadays articles of everyday use in general supply.[1]

It is certainly true, as Scheler says, that the way art wrests material from the intuition for the conscious understanding provides us with a kind of knowledge science can never offer. But it is equally true that the findings of abstract art, if we may call them that, confirm and support those of science. It is not mere coincidence that abstract art should develop its particular insights in a period when quantum theory and atomic physics have established the principle of indeterminacy and our extended knowledge of the microscopic world and of the space-time continuum together insist upon a logic of behavior quite different from that of a rigorously separated space and time in which all objects have a fixed place. Nor is it on the other hand a direct effect of science upon art. All artists are not as contemptuous of some of these discoveries as Willem de Kooning, but his response to "that space of science" does properly suggest that another space, that appeals to different training and interests and kinds of personality, separates artists from scientists:

That space of science—the space of the physicists—I am truly bored with by now. Their lenses are so thick that seen through them, the space gets more and more melancholy. There seems no end to the misery of the scientists' space. All that it contains is billions and billions of hunks of matter, hot or cold, floating around in darkness according to a great design of aimlessness.

The stars *I* think about, if I could fly, I could reach in a few old-fashioned days. But physicists' stars I use as buttons, buttoning up

curtains of emptiness. If I stretch my arms next to the rest of myself and wonder where my fingers are—that is all the space I need as a painter.[2]

The perceptions of art have, however, been shaped by an environment shot through with the visual appearance of the sciences, echoing the sounds of the sciences, speaking the languages of the sciences. Our atmosphere is heavy with scientific symbols. Our advertising art lives on science, or at least its façades. Surrounded by the surface phenomena of science, the artist cannot avoid responding to science, and in his response, negative or positive, absorbing some of its formal elements. Science as an environmental factor has as much to do with the concentration on the line of the Dutch painters of *De Stijl*, as it does with all geometrical painting. When Theo van Doesburg made over a cow into one large square, two small ones, and a variety of rectangles, all carefully placed within a larger rectangle—"Aesthetic Transformation of the Object," he called it—he was graphing the animal as a meteorologist might translate storm signals or other pressures into the isobars of his charts. And when De Kooning fixed on canvas the staring eyes, fence-like teeth, and football breasts of his mammoth "Woman I" or "II" or "VII," he was cutting angry patterns with a freedom possible only in a world that had been liberated from the dictatorship of ironclad physical law by the discoveries of pure science.

It was not only tradition that prevented earlier painters from such assaults. There was nothing in their experience or in the experience of their time to tell them that a cow was anything more than an animal with a very familiar shape and equally familiar functions. Physicochemical properties were not associated with cows, nor were linear structures, though both were as much a part of the life of a cow two, four, or eight centuries ago as now. One could make comments about woman or the world in which

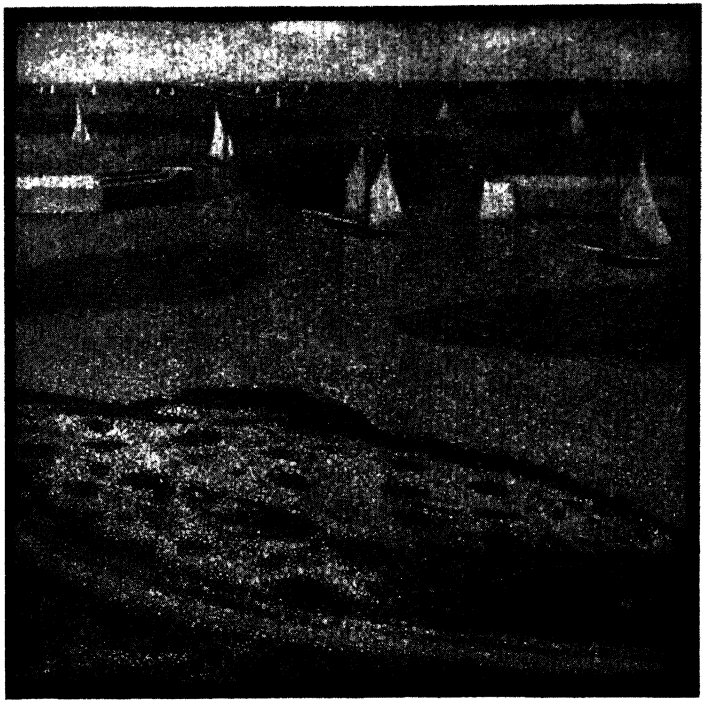
she moves in baroque or Renaissance painting, but they were restricted to the precise description of the person of the woman and the appearance of the rooms in which she normally moved.

Even the psychoanalytical paintings of the surrealists, as recently as two and three decades ago, were confined to recognizable objects, distorted by dreams into a curious sort of behavior that gave physiognomy to a tree and anatomy to a watch, but still objects in a three-dimensional space following an order that only reinforced our conventional order by its caricature of it. It took a considerable revolution in science, and a profound penetration of the consciousness of the layman by that revolution, before abstract art could be lifted free of the surface boundaries of objects. The impulse was there a half century ago, as the first geometrical abstractions of Kandinsky indicate and his tract of 1912, *Concerning the Spiritual in Art,* supports. But abstract art needed the double development, within its own order and within that of science, to translate the special tendency and the particular taste of a few artists for the abstract into a conventional expression, meaningful to thousands of artists all over the world.

With nothing as explicit in the way of theory as quantum mechanics and without a concept of form as clear as that of the more advanced animal and plant morphologists, abstract art has nonetheless approached the insights of modern science. Served by science initially, it now may return the favor. For the best of the abstract artists are able to achieve something like organic form in their constructions. Their really successful studies of value hold together; they are syntheses but they do not seem synthetic. From what they may be able to tell us of their work and its significance to them we may be able to work back into nature, and to learn something more about the meaning in creation of color and texture, line and plane and volume. It may be that in each case we will find ourselves once again confronted

by the inexpressible; the particular value, then, that these studies will have achieved will be to have found mystery where mystery must remain, at the end of all speculation, in the arts as in the sciences and in the life of the spirit.

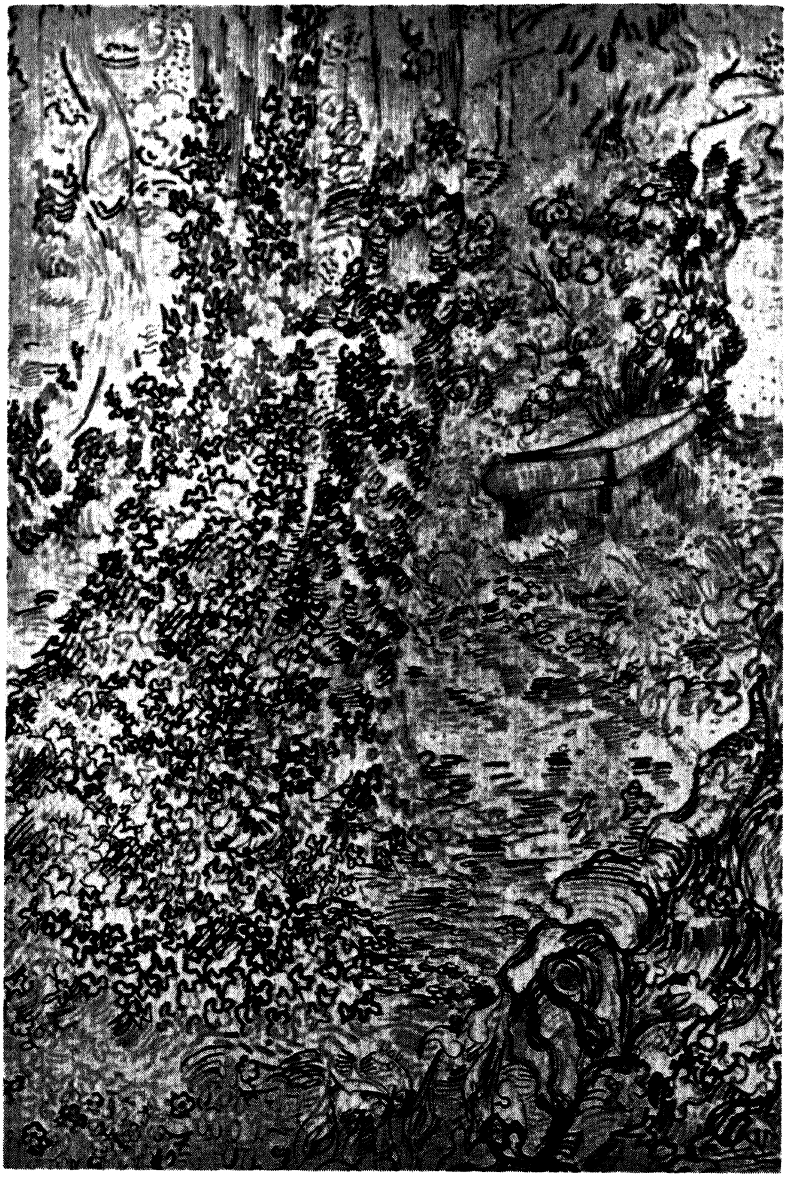
This may be the particular value of art. Each experience of an artist that goes beyond the dead end of frustration, if only it teaches him to recognize the value of frustration and turns him back upon his will, may have some of the stature of a spiritual exercise. In a time when the contemplative life has become obscure to most people and exercises of the spirit have about them a touch of the anachronistic, these experiences of the artist may be the only way for certain kinds of personality to discover what mystery is. That will be achievement enough for the art of abstraction.



Seurat / Fishing Fleet at Port-en-Bessin /
Collection, Museum of Modern Art, New York
Lillie P. Bliss Collection

Cézanne / Pines and Rocks /
Collection, Museum of Modern Art, New York
Lillie P. Bliss Collection

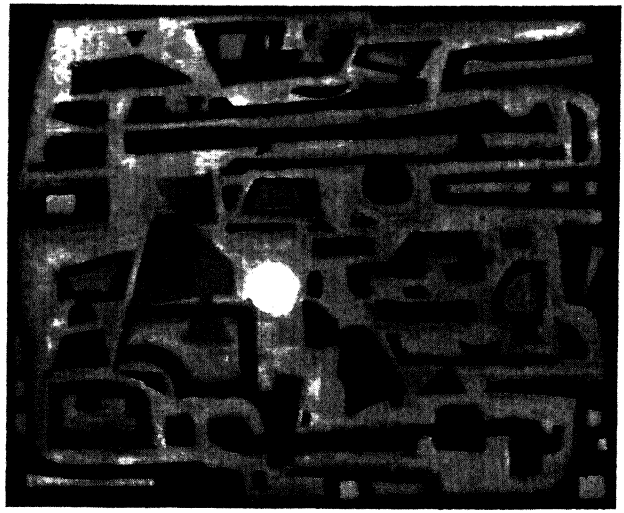
Gauguin / **Fantasy** /
The Solomon R. Guggenheim Museum, New York



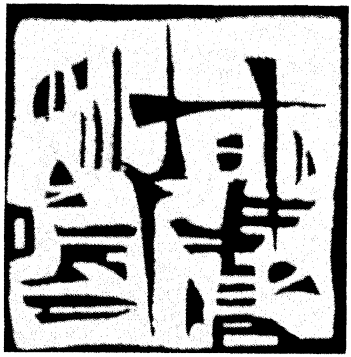
Van Gogh / Garden at St. Remy /
Photo Lavaud

Rouault / End of Autumn No. 1 /
Photo Giraudon

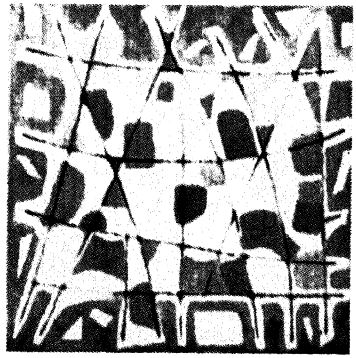
Rouault / Christ Mocked by Soldiers /
Collection, Museum of Modern Art, New York



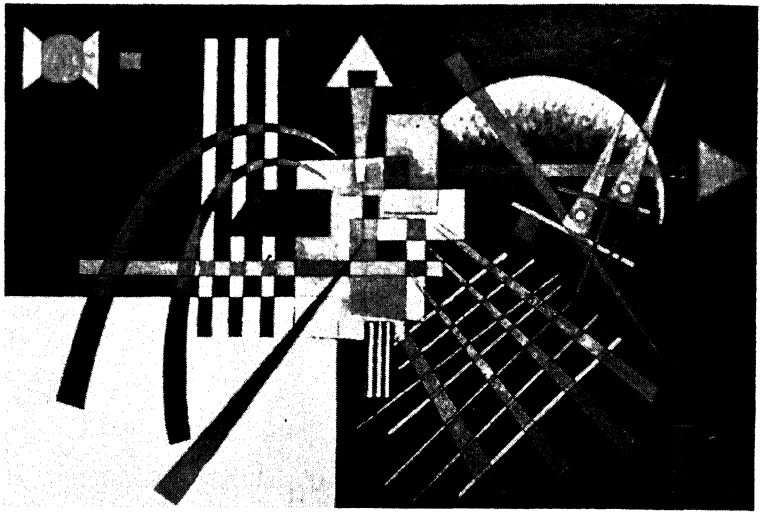
Manessier / Variation of Games in the Snow /
The Solomon R. Guggenheim Museum, New York



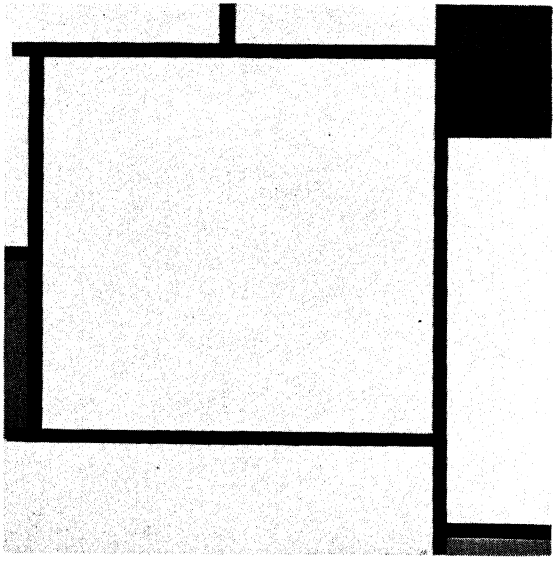
Manessier / Alleluia /
Private Collection



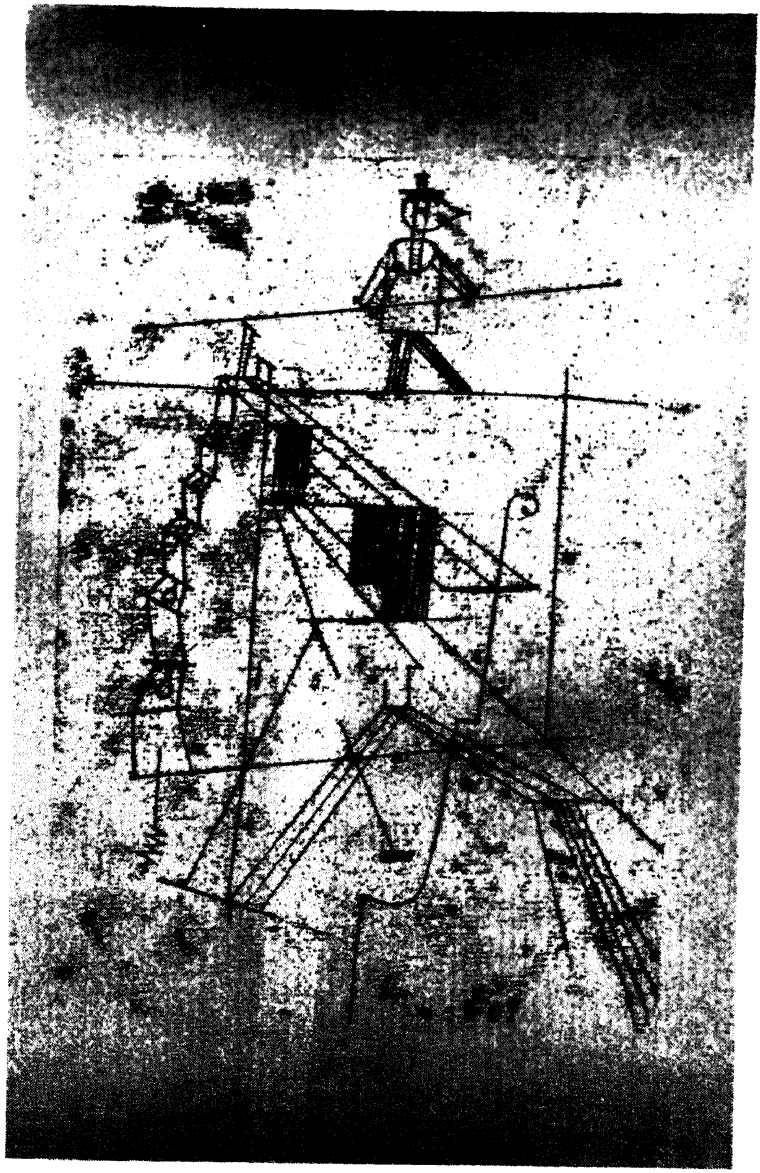
Manessier / Véronique /
Private Collection



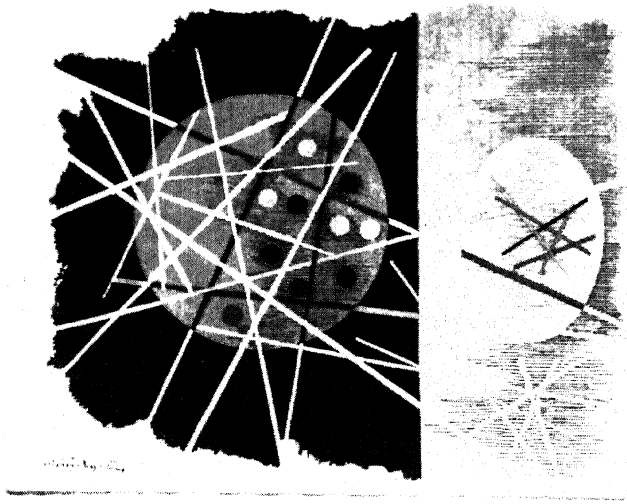
Kandinsky / Modified Composition 308 /
Photo Giraudon



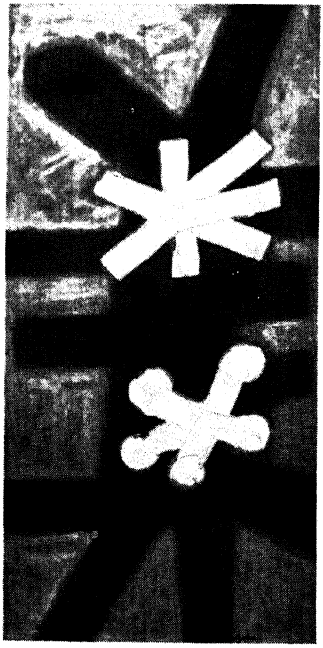
Mondrian / Composition 2 /
The Solomon R. Guggenheim Museum, New York



Klee / Tightrope Walker
The Solomon R. Guggenheim Museum, New York

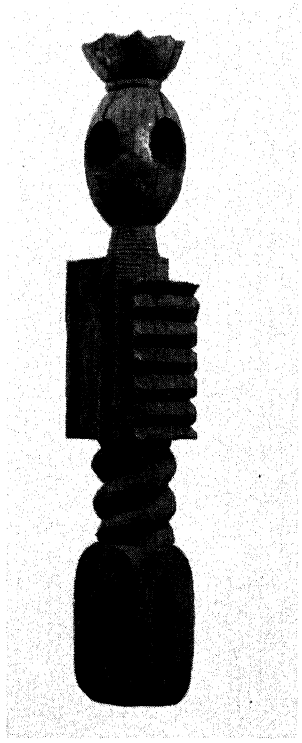


Moholy-Nagy / Watercolor 2 /
The Solomon R. Guggenheim Museum, New York



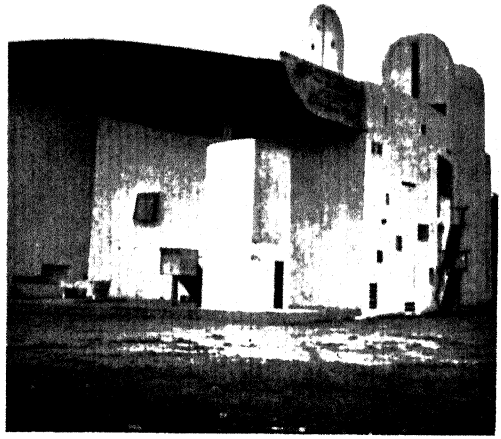
Gottlieb / W /
The Solomon R. Guggenheim Museum, New York

Lipchitz Pierrot with Guitar
Collection, Mr. & Mrs. Ladislas Segy, New York

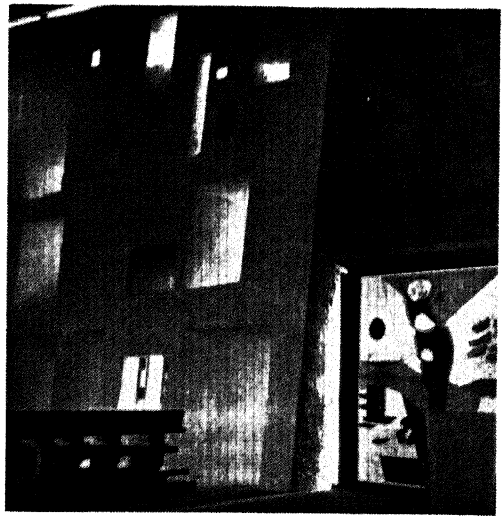


Brancusi / King of Kings /
The Solomon R. Guggenheim Museum, New York

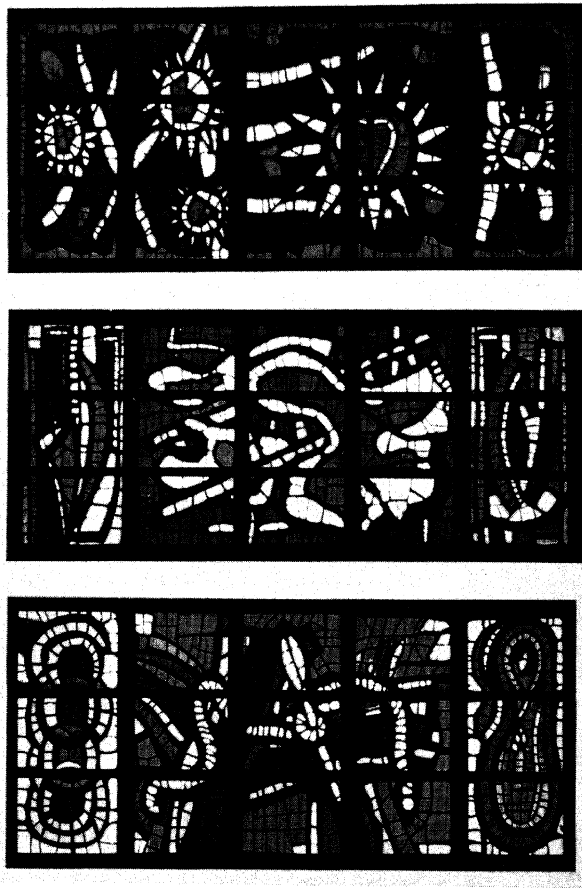
Epstein / Madonna and Child /
Convent of the Holy Child, London



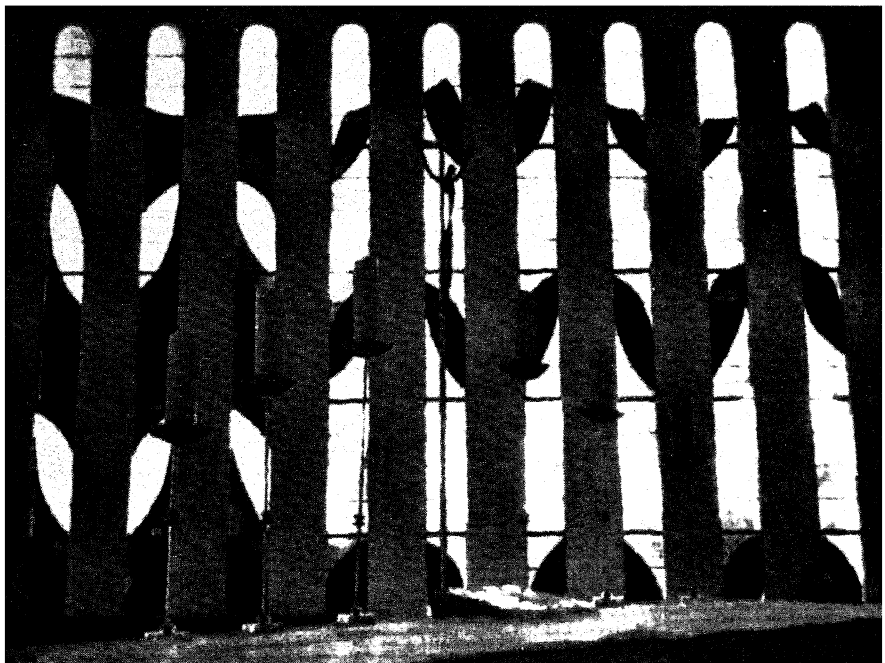
Le Corbusier / Chapel of Notre Dame du Haut /
Ronchamp, France



Le Corbusier / Interior of Chapel of Notre Dame du Haut /
Ronchamp, France



Léger / Stained Glass Windows /
Church of the Sacred Heart, Audincourt, France



Matisse / Stained Glass Window /
Nun's Chapel, Vence, France

Matisse / Mural and Stations of the Cross /
Chapel of the Rosary, Vence, France

10

the composer and abstraction

THE COMPOSER turns to abstraction more naturally than any other artist. In spite of the dubious heritage of romanticism, with its clutter of literary narratives, dances of death, windmills, romeoandjuliets, don juans, tristanandisoldes, incestuous giants, and other secretions of a diseased aesthetic, the composer remains on the whole a man faithful to his art. And his art is abstract. His content is firmly locked inside his form. He never comes right out and says what he means because he never means anything very specific. Or, if he does, he knows he cannot get anyone to understand precisely what it is that he means, even if he calls his work *Don Quixote* and identifies the windmills with which the good knight jousts by the soughing of the wind and the creaks of the mills, comparatively easy sounds to imitate in the orchestra. There will always be long stretches between the narrative points which do translate comfortably into music, stretches when the sound will only be intelligible in vague or slippery generalities and the most scholarly and exact knowledge of Cervantes will not be enough to guide one through the notes, the chords, the clusters of sound.

At his least, then, the composer is a decorator or a chef, serv-

ing his audiences tinkling delicacies. He fills appetites. He creates appetites. Now it is color with which he washes his listeners. Now it is *Salzburger Nockerl* and *Schlagsahne*. And every now and then it is—or at least used to be—a bordello in the concert hall, with Wagner and Richard Strauss, Debussy and Ravel titillating the glands. But even in these empty games, the feeling engendered is amorphous and hard to hold down to anything more specific than the comfort or discomfort produced by a bit of decorator's fluff or chef's pastry. In his most wanton displays, the composer is forced to a certain asceticism because of the nature of his craft. He himself may not remain pure. He may long ago have made total concession of his music to the literary program, may have decided that he is a storyteller, a painter of scenes—everything but a composer of abstract speculations. But his audience is protected. Because the musical program depends on words rather than sounds, it is never perfectly clear, either as narrative or music. The purity of sound outlasts the impurity of narrative. The music stays abstract.

In the twentieth century, a large number of composers have deliberately courted the lean diet of abstraction. They have turned with aversion from Ravel's lubricious shepherds and the elephantine gambols of Wagner's Norsemen. They have eschewed tropical travelogues, rejecting sun and games along with fun and games. They have even deafened themselves to the joyous frolics of mountain folks and village folks and valley folks with their jolly political overtones. They have turned to revivals of musical patterns formulated in the years just before romanticism, the seventeenth and eighteenth centuries, and often with very great distinction, as for so long Stravinsky and Hindemith did. Or they have set themselves the problem of defining the nature of music. They have looked for essences. And, if one takes the word of Schoenberg and some of his disciples, they

have actually found some of the reality underlying musical phenomena. They have atomized music. They have reduced it to its smallest units: the twelve tones that make up the diatonic octave. They have found the energizing particles by which Western music, at least, lives.

If this sounds more like the work of physicists and mathematicians than composers, that is reasonable enough. The composer, as Schoenberg's Viennese circle was quick to recognize, thinks and speaks in numbers. Everything in his world is measurable. He makes melodies, harmonies, and rhythms by intervals, that is by numerical relationships. Relationship is, in fact, the essence of his craft. The distance between notes, the frequency with which notes are sounded, the duration of a note's sounding—each of these is a matter of measurement with regard to another note or many notes, which is to say each is a matter of relationship.

To the average man, this kind of relationship is hopelessly abstract. Number makes sense only when it is adjectival, as in the celebrated *three* oranges or *four* apples of elementary arithmetic. The man who thinks of number as a noun—of a *third*, a *fourth*, a diminished *seventh*, or a flatted *fifth* complete unto itself, rather than a fraction of something tangible, like a pie —such a man is far removed from the world of common sense and ordinary reason. Thus all composers, no matter how conventional or conservative, are to some extent alien to the average man. But the composers of the twelve-tone school who spend their lives trying to capture mathematical shapes are particularly remote. For they have pushed music into forests of abstraction where the musical suburbanite simply cannot follow.

The philosopher and the theologian should not find it so difficult to follow the lines of investigation of the mathematical composers, whether they work within the new conventions of the

twelve-tone school or seek new ways of charting and graphing the patterns and shapes which hold their interest. For these composers are the true meditators and contemplatives of music. Whether successful or not in their attempt to make works of art out of mathematical relationships, the attempt itself is a noble one. They have left to the composers of popular songs and of film scores the perfumed music that so quickly stales on the ear. They are concerned with more enduring things.

But how enduring can this music be, the average man will ask, when what he has heard of it is so unendurable? The mathematical relationships, so energetically pursued by these groups of composers, have emerged in chaoses of sound not only impossible to follow but ugly to the ear, without a single melody (as the average man understands melody) to hear and to hum. This much must be admitted, that to those accustomed to nineteenth-century sweetmeats and the slightly more astringent but still sugary provender of the eighteenth century, much of this recent music will sound bitter and confused. It is, after all, designed much of the time to express anger, misery, perversion, futility, despair. Schoenberg, when he followed a literary program in his music, dealt with such things as a woman's discovery of the body of her murdered lover under a bench in the woods (*Erwartung*) or the extermination by the Nazis of the Jews of the Warsaw ghetto (*A Survivor from Warsaw*). Alban Berg chose as librettos for his operas Georg Buechner's *Wozzeck* and Franz Wedekind's *Lulu*. In the first, the true victim is the little child who is left on stage at the end, riding a hobbyhorse, oblivious of the fact that his whorish mother has been killed by his mentally retarded father and that his father has subsequently drowned; in the second, the true victim is the audience—and not entirely undeliberately—as it suffers through the abnormalities of a monumental sexual grotesque, the title character.

To the extent that such narratives express the character of the composers' times, and that the composers have said something significant about their times in translating the narratives into musical terms, these monodramas and operas will endure; if only as documents of the period, they are bound to survive. But they have something more in them than this sort of survival suggests. Unlike the naturalistic novel or play or film or television drama which presents its facts with a morgue attendant's detachment, these compositions tell their tales with compassion. One cannot help but be moved by the narrator's passionate feeling in *A Survivor from Warsaw* or by the terrible knowledge that must eventually come to the little child who runs away, crying "Hopp! Hopp!" to his wooden horse, in the last scene of *Wozzeck*. One recognizes here the atmosphere of tragedy. One understands, perhaps, the power of a school of composition that subsists on meditation and produces dramatic performances of such intensity. Even if one does not find the sounds of the music ingratiating, one must stop long enough to give serious consideration to composers who deal with such subjects with so much authority.

The subject matter of these composers is not limited to the atmospheres of tragedy, however. There is no clear limitation to them except that of the "being" of music. Some idea of that being may be discovered in Igor Stravinsky's description of the person of the twelve-tone composer he admires most, Anton von Webern, in his commentary on Webern's recently published letters:

The Webern of the letters is, first of all, profoundly religious, and not only institutionally (extraordinary, though, that he should compare the six movements of his Second Cantata to a Kyrie, a Gloria, a Credo, a Benedictus, a Sanctus, an Agnus Dei), but in the simple holiness of his feeling toward each of God's *essents* (a flower, a

mountain, "silence") as well. Music is a mystery to him, a mystery he does not seek to explain. At the same time, no other meaning exists for him but music. He stands before the Parthenon friezes and marvels at the sculptor's "conception," which he compares to his own "composition method . . . always the same thing in a thousand different ways" (in another letter: ". . . the meaning is always the same, however different the means"). He never explains beyond that, and he even admits, in one letter, to being severely tried by the necessity of explanation: "I am sometimes . . . tortured by teaching."

He is like a village priest in that his world does not extend beyond his village. . . . His manners and address are also both *villageoises* and priestly. He contains no word of technical jargon (to Berg: "Art must be simple") and no aesthetics ("I don't understand what 'classic' and 'romantic' mean"). He is infinitely patient and, of course, he takes infinite pains, but composing is entirely natural to him. . . . Webern was too original—i.e., too purely himself. Of course the entire world had to imitate him; of course it would fail; of course it will blame Webern. No matter, though. The desperate contrivance of most of the music now being charged to his name can neither diminish his strength nor stale his perfection. He is a perpetual Pentecost for all who believe in music.[1]

Igor Stravinsky

If Webern is a perpetual Pentecost for all who believe in music, Stravinsky is an eternal Epiphany. He has made a life, a career, a music of making discoveries. Almost all that music is or has been in this century can be found in Stravinsky's works. Like Picasso, he has moved restlessly from period to period, from style to style. He has written impressionistic music, neoclassical music, and now twelve-tone or serial compositions. He has written incidental music, ballet music, "pure" music—concertos, symphonies, chamber works. He has written an

opera, a setting for three psalms, and a mass. And now, firmly rooted in the twelve-tone idiom, he has written works variously liturgical or paraliturgical in texture and function, such as his *Threni,* settings of three of the five threnodies or elegies that make up the Lamentations of Jeremiah.

The meditative mind may find the *Threni* the most satisfactory of introductions to the abstractions of contemporary music. Far more than most works of this kind, it illumines its text and is in turn illuminated by it. The harshness of the music is matched by Jeremiah's own stridency. The strange couplings of voices are more than paralleled by the juxtapositions of image and idea in the Lamentations. Stravinsky has written in effect a gloss on the text of Jeremiah, a commentary that widens and deepens the meaning of the rumbling canons of the prophet's revulsion in the face of man and renewal in the face of the Lord. It is a very personal commentary; for no matter how far Stravinsky goes in his investigations of serial (or twelve-tone) composition, he retains all the marks of his own identity. The many shiftings of accent, the lean elegance of the melodic lines, the startling gradations of volume—all these recall several earlier Stravinsky styles and the one person of the composer, not exactly unchanging, but so much himself that one feels after a while that one can recognize him in any period, in any genre, in any mood.

The experience of the *Threni* may prepare the listener for the clipped lyricism of Webern, who rightly enjoys Stravinsky's admiration as "the discoverer of a new distance between the musical object and ourselves and, therefore, of a new measure of musical time," a man "wholly apart" from the spirit of his time and certainly one "profoundly religious" in his binding tie to music and through it to mystery. One may come by way of the music of Stravinsky and Webern, Schoenberg and Berg, to recog-

nize the soundness of the philosophy explicated by Stravinsky in his 1939–1940 Norton lectures at Harvard. In the third of those lectures, he emphasized the primacy of observation in the process of art: "the true creator," he explained, "may be recognized by his ability always to find about him, in the commonest and humblest thing, items worthy of note." He is not confined to conventional objects of beauty; quite ordinary objects will pique his interest and hold it. The accidental has a high place in his life as an artist. "If his finger slips, he will notice it; on occasion he may draw profit from something unforeseen that a momentary lapse reveals to him." But he never works to "contrive" accidents. He prepares himself to make use of them when they occur. He is a schooled investigator using the world around him as ordinary means toward an exalted end:

> What urge of the composer is satisfied by this investigation? The rules with which, like a penitent, he is burdened? No: he is in quest of his pleasure. He seeks a satisfaction that he fully knows he will not find without first striving for it. One cannot force one's self to love; but love presupposes understanding, and in order to understand, one must exert one's self.
>
> It is the same problem that was posed in the Middle Ages by the theologians of pure love. To understand in order to love; to love in order to understand: we are here not going around in a vicious circle; we are rising spirally, providing we have made an initial effort, have even just gone through a routine exercise.[2]

The Sunday composers of Paris

The improvising organists who play the 11 A.M. musical Mass each Sunday at the leading churches of Paris, Rolande Falcinelli, Jeanne Desmessieux, Marcel Dupré, and Olivier Messiaen, are by definition investigators. Not all of them are

as ceaselessly inventive or as determinedly experimental as the serial composers. Dupré is of the school that derives by way of Charles Widor and Louis Vierne from César Franck; he regularly improvises passacaglias and fugues, free fantasias, and other works which join the formal elements of Bach's organ writing to the wistful *fin de siècle* melancholy of César Franck and his disciples. But Falcinelli and Messiaen compose in a manner very close to that of the recent Stravinsky, often without fixed key or bar lines, and almost always with a continuity that derives directly from the accidents of the day. Theirs is a kind of investigation, of the very highest intensity, of the state of the air, the condition of the hour, the nature of their instruments (very fine ones, incidentally, the products of the most sensitive and imaginative of organ designers, Cavaillé-Col). Mlle. Falcinelli has studied the sacred books of the East; her meditations on the organ at Mass are informed by a personal meditative life of large resources. M. Messiaen cites as his own influences the poets Paul Claudel and Paul Éluard, Shakespeare, the Benedictine spiritual writer Dom Columba Marmion, a variety of musical sources—Russian music, Debussy's *Pelleas and Melisande,* plain song, and Hindu rhythms—as well as "all that pertains to stained glass windows and rainbows."

Olivier Messiaen

The music of the improvisers is not on record as it should be, taped at church on Sunday. But some idea of what it is like can be gathered from the compositions of Messiaen that have been recorded: the tumultuous *Nativity* suite for organ; the percussive two-piano suite, *Visions de l'Amen;* the occasionally more tender piano suite, *Vingt Regards sur l'Enfant-Jesus;* the cham-

ber work, *Oiseaux Exotiques,* in which the composer's predilection for bird song and the rhythms of the East is revealed by piano, winds, xylophone, glockenspiel, and a variety of percussion instruments; and the *Ascension* suite, transcribed for orchestra from its original keyboard form, and in that form easily the most accessible of Messiaen's works, a simple single-minded ascending sweep across the choirs of the orchestra.

As much as any expression that appeals to the senses can be, Messiaen's music is an art without types of images. Even when he deals with the dramatic events of the mysteries, he does his best to flatten the associated images into their underlying abstractions. The *Vingt Regards sur l'Enfant-Jesus* are literally a series of glances, of the Father, of the Son contemplating Himself, of the Cross, of Time, of Silence, of the Church of Love. The *Ascension* draws the material for "Four Symphonic Meditations for Orchestra" from Scripture and liturgy; in its concentration on the yearning for and achievement of heaven, it barely permits even the most general composition of place. Even in the nine meditations which make up *La Nativité du Seigneur,* the movement is away from any precise image: movements which center on the figures of the Virgin and Child, the Shepherds, and the Wise Men altogether avoid any specifications of physical dimension; and all the rest of the suite is designed to evoke some sort of response to the abstract themes of eternal purposes, the Word, Jesus' acceptance of sorrow, and His presence among us.

There are concretions in Messiaen's music. He is in fact one of those who after the last war conceived and developed a theory of *musique concrète.* But what is concrete in his music is not a literary program at all. It is music itself: "a different group of elements in music, relegated to oblivion for a long time, is being spotlighted in our own day, among them especially the element of rhythm in all its facets: duration, timbre, type of touch and

attack, intensity." Musicians of this sort are far from the florid creationism of the nineteenth century. They do not indulge in verbal fantasies about "the creative act." As Stravinsky says about "creation," it means nothing to them:

> The word was already badly overloaded when psychologists made it their propaganda term for what was no more than a change in methodology: a child's scribble is not an "act of creation," nor is our intestinal function, as Freud thought, since animals do as much and animals cannot create; the word, which to Coleridge meant the noblest operation of imagination, is now horribly debased. Only God can create.[3]

For an "act of creation" these musicians have substituted an act of investigation; for the concretions of literature, those of music; for the abstractions of aestheticism, those of the spirit. The result may not always be ingratiating sound, but it has certainly provided us with a deeper understanding of the nature of music and perhaps of something a great deal larger than music.

11

the art of verbal abstraction

THE GREAT experiments of the literary revolution of the modern era apparently came to an end with the last gasps of Dada in the thirties. What more thorough assault on the word could be made than sound poems such as Kurt Schwitters' "priimiititttiii," which consists of little else than the repetition of the title? The last thirteen lines are perhaps the most moving—but moving to what or to whom?

priimiititttiii *too*
priimiititttiii *taa*
priimiititttiii *too*
priimiititttiii *taa*
priimiititttiii *tootaa*
priimiititttiii *tootaa*
priimiititttiii *tuutaa*
priimiititttiii *tuutaa*
priimiititttiii *tuutaatoo*
priimiititttiii *tuutaatoo*
priimiititttiii *tuutaatoo*
priimiititttiii *tuutaatoo*
priimiititttiii *tuutaatoo*[1]

Dadaism was a concerted movement of poets, painters, sculptors, composers, type designers, and designers of movements to

divorce sense and sound. Of course it failed in that aim. There is no sound that letters can make that does not have some association of meaning in some language. Even the sounds of the gurgling infant after which the movement was named have meaning—for parents, for Slavic peoples (to whom the two syllables communicate a vigorous assent—"da, da" means "yes, yes" in Russian, Bulgarian, etc.), and inevitably for many others too. "Da" means "there" in German; "da" means "give" in Italian; "da" is a prefix in Sanskrit and Greek which suggests all sorts of words to those trained in either ancient tongue.

Dada did succeed in making a certain iconoclastic spirit contagious. Its multiple manifestoes blasted cant and pretense engagingly and effectively:

Dada spits on everything. . . . The cabinet has been overthrown. By whom? By Dada. . . . Dada runs everything through a new sieve. Dada is bitterness laughing at everything that has been accomplished, sanctified, forgotten in our language, in our brain, in our habits. Dada says to you: Here is Humanity and the beautiful absurdities that have made it happy up to its present advanced age.

It put the public on notice:

Before going down among you to pull out your decaying teeth, your running ears, your tongues full of sores. . . .
Before extinguishing your appetite for beauty, ecstasy, sugar, philosophy, mathematical and poetic metaphysical pepper and cucumbers,
Before disinfecting you with vitriol, cleansing you and shellacking you with passion,
Before all that,
We shall take a big antiseptic bath,
And we warn you:
We are murderers.[2]

What Dada murdered was what Stravinsky calls the "horribly debased" act of creation. Accident was now enshrined in art. Contrivance was banished. The mere concatenation of things was enough to give the quality of art, if chance arrangements of sounds, colors, shapes, words could somehow be caught and fixed to a page, a drawing board, a piece of music note paper. Tristan Tzara, the poet laureate of Dada, explained the process to poets:

> To make a dadaist poem
> Take a newspaper.
> Take a pair of scissors.
> Choose an article as long as you are planning to make your poem.
> Cut out the article.
> Then cut out each of the words that make up this article and put them in a bag.
> Shake it gently.
> Then take out the scraps one after the other in the order in which they left the bag.
> Copy conscientiously.
> The poem will be like you.
> And here you are as a writer, infinitely original and endowed with a sensibility that is charming though beyond the understanding of the vulgar.[3]

The result was not often a poem of any quality that one ordinarily associates with words. Poems made this way looked as if they had been made this way. The intrusion of the sensibility of painters like Hans Arp and Kurt Schwitters, Man Ray, Marcel Duchamp and Francis Picabia made a difference, however, turned accident into art, made chance the very useful servant of half a dozen arts. Occult arrangements of words—syllables, letters, parts of letters, punctuation marks—remade typography and the printed page. Montages of the most bizarre kind freed

photography of the need to represent things naturalistically. Without quite atomizing the word, Dadaists discovered that it was susceptible to some of the same reductions as the lines and textures and colors of painting and the sounds of music. It was possible to pick away at the poem and the poet and all the processes of poetry until nothing was left but some nuclear elements.

The word

Unfortunately for Dada and all those seriously interested in its aims, words cannot be reduced quite the same way the components of music and painting can be. There are sound structures in poetry—and in prose, too, of course—but sound is not the single basic unit of the word. Words speak to the eye as well as to the ear, most frequently, in fact, make their first communication to the eye—which does not make line and texture and color the basic units of the word. Syllables? Letters? Yes, they are basic, but they are not the analogues of color and sound; they do not communicate the essence of their art as one single note or a blue line may speak for a piece of music or a painting. Sooner or later one must recognize that words are in a sense their own basic units: in the end, as in the beginning . . .

Words are affective signs. They convey all sorts of meanings. They are packed with emotional overtones and associations. No matter how poorly used or how ineptly put together, they remain inviolate. Each one, each single word, continues to evoke responses, to stir affections. They may say too little or too much. But they say. They caress. They sting. They support. They destroy.

Most poets of our time, like most poets of any time, have been

content to use words in an ancillary capacity, to support their thoughts, to report their feelings, for purposes of expression, of repression, of confession, for every kind of means, but almost never as an end in themselves. The Dadaists are an exception. Some of the time, at least, James Joyce is an exception, especially in the elaborate puns of *Finnegans Wake.* Gertrude Stein's experiments with the arrangements of words have taught us a little about the habits and customs of English and American speech. In some of the apparatus of Guillaume Appollinaire and e. e. cummings, there seems to be something like a physicist's attempt to get at the elemental energies of verbal matter. One sees soon enough, however, that these two poets, like the Surrealists who came after Dada, are merely using typographical devices to ornament or to extend, or to diminish the meaning of their lines. Their experiments with lower-case settings of words, with tumbling lines or drifting letters, are merely adventures in dynamics. These assaults on the traditional arrangement of lines, these ideograms, are really not very bold. They are attempts to get a *pianissimo* or *fortissimo,* an *andante, allegro vivace,* or *lento, lento* into poetry. Vachel Lindsay's markings for the reader may be more useful; they are certainly more direct.

In spite of a few typographical tricks, some choice puns, and some manipulation of speech patterns, then, experiments with words in recent decades have been very few. Poets in particular have been docile to tradition and have as a result seemed almost languid, certainly lacking in some vitality, as they have gone through their carefully prescribed paces. Forms have been, on the whole, the inherited ones. Rhyme has come back. Lines have clicked comfortably into metrical place. Metaphor and simile have dominated a small collection of rhetorical figures. There have been a few virtuoso performances such as W. H. Auden's reversion to Renaissance pastoral convention in his "baroque

eclogue," *The Age of Anxiety,* and Ezra Pound's continuing remaking of American, European, and Chinese history in his *Cantos.* But the amount of poetic invention that can be sifted out of the poetry of the last two and a half or three decades is very little. In England, in France, in Spain, in Italy, in Germany, the forms of poetry have been the familiar ones. In this, at least, no reader need fear. Almost anyone can move nimbly down the lines, singing as he goes.

Yeats, Valéry and obscurity

Obscurity has not been removed from poetry with the return to conventional form. It could not be. It should not be. Poetry is, like all the arts of our time, inclined to abstraction. But it works out its mysteries in tight little monologues or somewhat more extensive essays, in which the tone is still that of the dramatic soliloquy but the terms are densely philosophical.

William Butler Yeats made the modern poem safe for obscurity. After he had passed the roses of his youth by and was no longer so much upset by the contempt (fancied or real) of revolutionary women and revolutionary Ireland who did not (quite) requite his love, Yeats turned to the East and that part of the West he thought could safely go with the East. He imposed philosophy upon theology, and theology upon theosophy, and astrology and trance on all, and made it all come out solid poetry, but not very sound thought, and often not thought at all. A similar set of transformations, though much better grounded, was worked in French poetry by Paul Valéry, who, like Yeats, was a painter of sorts and could always be depended upon to give motion and a scenic view to even the most stubbornly obscure of his lines.

Tradition and T. S. Eliot

The imitators of Yeats and Valéry, to a man less gifted than their models, have provided the reader who will stay with them with similar syntheses of ill-assorted men and mottoes and manners. But one rarely wants to run their tags of quotations down or to worry oneself long about what odd fishing they have done in the waters of the East or West. One turns instead, and rather with relief, to the comparatively simple lines of the poetry of T. S. Eliot from *Ash Wednesday* on, in which his own running argument with God has been so openly exhibited. There are mottoes still, and manners, whole chunks of Scripture and John of the Cross, Lady Julian of Norwich, and Dante. But they have been assimilated. One can usually understand them as quoted or paraphrased, in at least one clear sense, without a moment's further investigation. And upon closer examination, brought back into their original context, they make a richer, a more profound sense, just as Boethius and St. Thomas, the troubadours and St. Augustine do, when after reading quotations or paraphrases of them in Dante's *Commedia* one follows them back to their own writings. One discovers, too, having done this with Eliot, that it is not a procedure that starts and stops with him. All poets after him who have similar struggles to narrate employ similar defenses and methods of attack. They wander into the same pastures with the same shepherds. Their reading has often been fashioned by Eliot's, and often to the same ends. The result is not always a clear identity; it is too frequently, perhaps, a handsomely polished imitation, with its surface glitter its only apparent recommendation. Actually, there is something else there, in the poetry of this particular school of imitators; there is an appealing honesty. They too, these poets say, have

known the dry rock, the arid earth, the world without creation or Creator. They too have fumbled, protested, allowed themselves to be distracted and numbed into despair. They too have emerged, or are still emerging; they too are preoccupied, as they must be, with the landscapes of purgatory.

A knowledgeable reader may not turn with any particular need, or return with any special joy, to these works so rich in the details of emptiness, so poor in illumination, and so utterly without the treasures that wait upon illumination. Nothing in Eliot matches the direct experience of John of the Cross or Dante, though one may be caught by the skill of a paraphrase, the appositeness of a quotation, the deftness with which the modern poet roams between his world and the medieval Italian's and Renaissance Spaniard's. Nothing in the imitators and followers of Eliot has enough of the flavor of the distant source or the forthrightness of the more immediate one. Still, one reads them, Eliot and all who come after. For, lacking in the greater insights, they have some important smaller ones. They speak in the language of our day, in the rhythms, in the images. Hell is the subway. Purgatory is a suburb. God only knows what heaven is, but this we know, that we must approach it through the bars, the coney islands, the kitchens, the cocktail parties, the department stores, the factories, the kindergartens, the foxholes, the mushroom clouds, the seminar rooms of this world.

Because of the relentless quoting and paraphrasing, yes and the plagiarizing too, of our poets, we can carry with us through the bars and kitchens and factories and foxholes John of the Cross, Dante, Lady Julian, Augustine, and many, many more of the same importance, who bring the same consolation. We move to the Greeks and the Romans and their principal Renaissance admirers with Valéry and through almost every system of

thought, sound and crackpot, with Yeats, and because of both we hold permanent conversation with fools and wise men and know some of the wisdom and some of the foolishness of both.

Pound, Pisa and mystery

In the midst of the wire-cage compound in Pisa in which he was incarcerated at the end of World War II, and in the midst of the frequently scurrilous lines he wrote there, Ezra Pound mused, speaking to a ghost out of Pierre de Ronsard, perhaps, or a lady still alive, or the lady who is the lady of all poets,

> Quand vous serez bien vieille
> remember that I have remembered,
> mia pargoletta,
> and pass on the tradition
> there can be honesty of mind
> without overwhelming talent
> I have perhaps seen a waning of that tradition.[4]

Pound's own example and that of recent poetry proves his final sad reflection wrong. There can be honesty of mind without overwhelming talent. Modern poets show it. What is more, they make it attractive. The attraction is in the several simultaneous returns of the modern poet. Uncomfortable with the experiments of Dada and all the other movements like it, not gifted with overwhelming talent, he has settled for old forms and older contents. He has seized again the conventional modes of poetry. He has been seized again by the traditional moods of poetry. Pound's tuneful words in another of the Pisan cantos are very much to the point. Their sixteenth-century manner matches their matter:

What thou lovest well remains,
the rest is dross
What thou lov'st well shall not be reft from thee
What thou lov'st well is thy true heritage
Whose world, or mine or theirs
or is it of none?

Once again, the final answer is in mystery—"What thou lovest well"—whatever that may be; that remains. The poet of our time has loved well. In this he can take pride:

To have gathered from the air a live tradition
or from a fine old eye the unconquered flame
This is not vanity.[5]

And we can take comfort.

12

the art of the concrete

THE ABSTRACTIONS of modern literature are uncomfortable ones. They seem more often than not to be abstractions of despondency or disease, of a loneliness without surcease or solution. The makers of these abstractions take us through oblique lines of verse or involuted narratives only to bring us to a cruel center of despair and to leave us there. And the process seems almost inevitable and invariable. When a poet or a novelist turns abstract, his destination seems almost always to be despair. There are often raucous laughs between the beginning and the end, as in the lusty creations of Dada. There may be no end of loud or soft laughter, as in any number of the episodes of *Finnegans Wake*. But usually, in this sort of abstraction of words, of phrases, or of whole literary structures, the end is misery: One can do nothing but expose corruption, as in Dada, or one must keep turning the cycle of history round and round and show it each time running down into death and destruction and the soiled relations of fathers and children, as in *Finnegans Wake*.

Hope does not seem ever quite to be the aim of abstraction in modern literature. There is not much hope in the brilliant verbal maneuverings of Paul Valéry, except the hope that words may prove a successful end in themselves. There is no more hope in the poetry of Yeats, though there is a certain naïve trust in the saving powers of custom and ceremony (if only they can be revived) and in the prophetic force of his mosaic of mythologies (if only it can be understood). The examples multiply, but hope does not. Not in Dada, not in James Joyce, is there much hope. Not in Valéry, not in Yeats, not in Gertrude Stein's memorable expansions of ordinary speech into novel and play, not even in Ezra Pound's remarkable compressions of extraordinary speech into verse. Hope is neither the concern nor the achievement of these masters of abstraction in literature. Hope, when it comes in the literature of our time, comes in the art of the concrete.

When T. S. Eliot turned from the landscape of dry despair, which he offered in *The Wasteland* desiccated fragment by desiccated fragment, to a serial narrative of his conversion, he moved from abstraction to the concrete. By the time he had reached the celebratory movements of *Four Quartets*, after the more restrained statements of *Ash Wednesday* and the Ariel poems, he had settled for a most incisive, most precise and most becoming concreteness. All the abstractions of time and space, of meditation and speculation and prayer, are summed up this way, as he sits in "a secluded chapel," on a darkening winter day in England:

> History is now and England.
> With the drawing of this Love and the voice
> of this Calling . . .

What he has reached, with every sort of pain and privation, or at least come to know he must reach, even at the cost of self-annihilation, is

A condition of complete simplicity.[1]

Now—if he has reached that condition—or then—whenever he (or we) may reach that condition—"all shall be well," he says, quoting Lady Julian of Norwich, "and all manner of thing shall be well."

Hope appears this way in Christian writers, concrete and tied to religious exercises and fitted out with mottoes and tags drawn from the masters of the spiritual life. It is no surprise to find it thus appareled, more or less clear, more or less open, in the later Eliot, in the later W. H. Auden, in Paul Claudel, in François Mauriac (even in the midst of stumbling Jansenists), in Georges Bernanos (even among bumbling Pharisees). But hope is not the unique possession of Christian writers. It is the virtue too of those who have other faiths, however curiously come by, however curiously located. It is in the great forced march to the illuminating dark at the center of the blood that the men and women make—especially the women—in the novels of D. H. Lawrence. It is in the agonizing attempts to offer up their lives, as a penance for the failures of the modern world, of Albert Camus' central characters in *The Plague* and *The Fall.* It is in the encircling movements of Yuri and Lara in Boris Pasternak's *Dr. Zhivago,* which raise up hope even in the festering cities of the Soviet plain and make the death of the title character in a trolley car seem an act of Christian piety and a stroke of providence. And it is in that literary genre which most insistently demands concreteness, the drama, as it has been practiced by the very makers of the modern theater.

The drama defies abstraction, for there always before the au-

dience's eyes are the most convincing exemplars of the concrete: living, breathing human beings. No matter how remote or how obscure the dialogue or the actions of people on stage may become, they remain people. We are tied to them as to blood relations; they are tied to us as alter egos. Nothing can altogether separate us, not the conventions of Greek tragedy, not the deliberate alienation of the audience of such a dramatist as Bert Brecht, not the carefully contrived obfuscations of a Samuel Beckett. As long as the distinctive lines of human life are present, the characters on stage are present to us, palpable to the senses, alive to the touch. The special endowment of the modern theater, at its best in any case, has been to add to the unmistakable life of its characters an almost equally convincing hope.

Hope in the modern theater comes by way of rebellion and exposure. Ibsen and Strindberg strove to overthrow cant and pretense and tyranny and oppression in the late nineteenth-century and early twentieth-century world, and to remove from the stage the means by which the theater had either covered up misery and exploitation and pomposity or sought to avoid dealing with them. They started as naturalists, concentrating on exterior details, and ended as dramatists of interiority, having found the causes of failure and futility and debilitation far inside man. In their great dramas of the spirit, such as Ibsen's *John Gabriel Borkman* and *When We Dead Awaken* and Strindberg's *To Damascus* and *A Dream Play* and *The Ghost Sonata,* they suggest that man has resources capable of meeting his tragic situation, though not always the strength to make use of them. That conviction more and more becomes the obsession of their successors, especially those whose themes are tragic or the next thing to it: Man has a residual power with which he can restore the world; he lacks only intensity of spirit or cer-

tainty of conviction, or sometimes worse, the clear direction as to how to use his power. In Bernard Shaw, this appears as a kind of continuing tragi-comedy, in which figures with the potentiality of supermen keep turning themselves into little men because of the poverty of their imaginations or the timidity of their spirit as they calmly turn down the invitation of the Life Force to remake the world. But with Shaw there are happy exceptions—Joan of Arc, the Lady Mayoress of *Getting Married*, the affable ancients of *Back to Methuselah*—and they prevail in spite of the unwillingness of the world to accept its own saints and sages.

Hope in Jean Giraudoux's plays is also perpetuated in defiance of the world, by a madwoman in Paris, by a gardener in Sodom, by a wistful Judith whose beheading of Holofernes is accompanied by her own election to womanhood. In the tragedies of Garcia Lorca, hope is the light against which we can make out the dark actions of a barren woman (*Yerma*), or of violent love (*Blood Wedding*), or of a Manichean family from which love has been banished (*The House of Bernarda Alba*). It is hope alone and only hope which makes so affecting the despair of these plays, the most authentic tragedies of the twentieth century. Even in inept performance, they puncture the soul, produce something like the requisite pity and fear, and enkindle a kind of hope which turns eagerly to prayer for its expression.

Terror is dissipated by several of the magnificent tragic figures of the contemporary drama. We see their example and we are, if only for the space of a drama, no longer afraid. Women, almost all of them, they offer their physical weakness side by side with their spiritual strength, and as they do so they act out almost precisely the condition of man in this time. They are, as we are, unequal to the forces arrayed against them, unequal to tyranny, unequal to military might, unequal to any and every incarnation

of hostility and hate and destruction. They, like the rest of us, are reduced to the weapons of the spirit. But what strength they give us by their use of those weapons, what courage, what faith, what hope!

Jean Anouilh's *Antigone,* written and performed under the Nazi occupation of France, offers us in its title character a whole strategy of rebellion against enslavement and dictatorship. There are no tanks, no planes, no bombs, no Maquis in this strategy, but just a complete refusal to surrender. But with this refusal, there is also a furious openness which is at the same time a humble candor. In her last words, a note to her lover who is the son of the dictator, Creon, Antigone says, "Forgive me, my darling. You would all have been so happy except for Antigone. I love you." [2] There is a profound truth in those words. Without the relentless opposition of an Antigone, we could all settle down complacently, maybe even happily, to life under a dictator, having made our peace with despotism. Without an Antigone, we might be happy—or at least think we were. But without an Antigone we should lack love—and real hope.

Figures of the warmest love and the coolest honesty, figures of the most striking concreteness, these dedicated women play nightly in the theater of our consciences. The whore, Argia, who grows to heroic size, much larger than life but altogether alive, in Ugo Betti's *The Queen and the Rebels,* is one of the most convincing of these performers. She is forced to play the Queen of a country ruled by a revolutionary rabble; she is forced into her role by events, with that inevitability and irreversibility which define tragedy. But she never loses the honesty which is, perhaps, one of the few virtues of her profession. "I am sinning still," she says of herself and the nobility with which she plays her role, "since of what I have done tonight I am a little proud. . . ." She knows, however, that what she has acted

out is the special strength of the human spirit, and that though it end in death, it brings a greater peace than life can offer. "I believe that God," she says in a speech dotted with pauses, "has intentionally made us, not docile, for that He would find useless . . . but different from Himself and a little too proud . . . so that we may . . . stand against Him, thwart Him, amaze Him. . . . Perhaps that is His purpose. It is a long struggle. Only at the end do we find reconciliation, and rest. I go away rich. . . ." At the end, still a woman, with more awareness than most women of the attractions of her sex, she remembers somewhat absent-mindedly to redden her lips. Then she goes to her death, with the sign of virginity, the sign of transformation in her life, the star Diana, shining over her. Her last words are very personal; they apply directly to her. They also apply to the rest of us, if we want them to: "Unquestionably, this is a seat for kings, and in it we must try to live regally." [3]

Henry de Montherlant calls this sort of performance a "setting free, by passion, of sleeping forces . . . rendering the impossible possible," in the notes that accompany his great drama of charity, *The Master of Santiago*. Charity for him has many of the qualities of a passion, "all the fire of passion, all its impetuosity, austerity, exclusiveness, tyranny"; but, he reminds us, "a part remains that is contemplative, pure, and disinterested." [4] That is the startling mixture of elements these women possess. They are on fire. But the center of the flame, in every case, is cool. They are detached enough, no matter what the pain, in torment, in death, to see themselves and their world as it really is. They are passionate enough; they are also conscious of what they are doing. Theirs is an elected passion, a chosen suffering, as in the prayer of Yerma, that most touching of women, whose womb cries out for a child. Let it be painful, she says to the Lord—

Open your rose in my flesh
though thousand thorns it have.

Let it be painful, but let it *be*—

Upon my barren flesh
one rose of all the wonder.[5]

That is the way that terror goes and hope comes—in such attitudes, in such women, in such theater.

It is not the theater of easy entertainment that offers such hope. The concretions of box-office drama are the new naturalism, full of perversion and repression and death in life, and the new musical comedy, full of pretension and the scattered corpses of the novels or biographies or plays that have been mutilated to make their spectacles. No, hope does not come from angry young men or cynical young men, from Arthur Miller or Tennessee Williams or William Inge, from Rodgers and Hammerstein or Lerner and Loewe. It comes from Ibsen and Strindberg and Shaw, from Montherlant and Giraudoux. It comes from Anouilh's *Antigone* and Betti's *Argia* and Garcia Lorca's *Yerma*. It comes from the unbroken line of dramatizations of the majesty of the human spirit which establish the right of the theater in our time to be compared with the theater of the Greeks and of the Elizabethans. In such concreteness, contemporary literature can offer a fair match for the abstractions of painting and music. It can offer hope.

PART IV

THE RESPONSE OF LOVE

13

the world within

WE HAVE witnessed in our time a remarkable pilgrimage. It could be called a pilgrimage of the intellect. It could be called a pilgrimage of the heart or of the spirit. It has led man step by step from the world around him to the world inside him. Starting with a minute inspection of matter, man has moved through the closest possible examination of all the ranks of creation to an equally demanding scrutiny of himself. And as he found in his other inquiries, into amoebae or ants or atoms, mollusks, molecules or slime molds, he has discovered wonders, but now the greatest wonders of all, the mysteries and marvels of human interiority.

To begin with, in this recent inspection of man, there was perhaps something less than awe. The examination of man was often conducted in terms of a gross scientism, a boundless faith in the ability of science to solve all problems. Those who did the examining frequently assumed that all they had to investigate were things. As earlier animal things, vegetable things, and mineral things had been examined, now human things could be picked over. If there were differences between men and the lower orders of the animal kingdom, these were only differences of

degree. A category could be established, a formula struck, a method found to put everything in its place, the place of a thing.

The conviction that man could be studied in essentially the same way one examined things in the world around him was hardly lessened by the stubborn determinism which laced together Sigmund Freud's early intuitions about man's unconscious life, his first published casebooks and theoretical works. Freud seemed to see man as very little more than the product of the pressures of infancy and early childhood, a bundle of energies and impulses responding clumsily to parents and parent substitutes with fear and terror and debilitating dependency, with resentment and antipathy and every sort of crippling mechanism of defense or attack or repression. According to this psychobiology, the emerging person never left altogether behind him the shattering effects of childhood and family experience such as the Oedipus and castration complexes, a terrifying fantasy life acted out night after night (and sometimes day after day) in dreams, and an almost total openness to the pressures of society. Husbands and wives, parents and children, bosses and fellow employees, one's own sense of duty, one's conscience—all worked to tie one up in neurotic or psychotic knots. The tie as often as not turned out to be umbilical. This apparent defenselessness against both internal and external forces could be explained and analyzed, and, in the course of analysis, just by coming to see the exact source of the problem, the psychological illness and whatever physiological responses might be associated with it could literally be rooted out.

Freud was a relentless categorizer and classifier. Overlying all his classes and categories was a typology of basic drives. The two fundamental ones were, reasonably enough, eros or the life drive and thanatos or the death wish. But the channels the two sets of impulses took, unreasonably enough, were entirely deter-

mined by the way childhood had left one, an oral type or an anal type or a genital type or some curious combination of the three. No wonder that to some readers of Freud, and even to some disciples, man seemed a hopelessly predestined creature, with original sin re-enacted in each person's life in the tortures of childhood which shaped all the years that came after. Not the most extravagant promises that the processes of psychoanalysis could offer of freedom from lifelong torment could entirely efface the sense of despair with which Freud often left his followers.

But the atmosphere changed. Within a few decades, as these things are measured, despair gave way to what is unmistakably recognizable as hope. The distance from Freud's *Interpretation of Dreams* (of 1900) and *Psychopathology of Everyday Life* (of 1904) to the psychological publications of the 1950's and 1960's is enormous. For if early Freud and Freudianism gave renewed confidence to crude scientistic thinking, late Freud and Freudians have done just the opposite. The degrees of emphasis have changed markedly. In his last years, years of reflection and meditation, Freud's own thinking became more supple and less deterministic. Today few schools of psychoanalysis or any other kind of psychotherapy work any more in an atmosphere of doom, even verbal doom. Light has entered the clinic and the council chamber, as inevitably it had to enter wherever psychologists or psychiatrists work. For almost all these men are motivated by compassion, and where compassion thrives darkness and despair must disappear.

Compassion is not solely responsible for the striking changes in psychological thought, however. Clinical evidence has piled up, if not flatly to refute Freud's laws of cause and effect, at least enough to unsettle any naïve believer in Freudian typology. For one reason or another his pansexuality has been fairly widely

abandoned. One may realize, as Erich Fromm does, "Freud's error in seeing in love exclusively the expression—or a sublimation—of the sexual instinct, rather than recognizing that the sexual desire is one manifestation of the need for love and union." One may probe further, as Fromm also does, Freud's failure to understand "the masculine-feminine polarity, and the desire to bridge this polarity by union," an error crucial enough to lead Freud "to the assumption that sexuality per se is masculine" and thus to "ignore the specific female sexuality." [1] Or one may understand in the language of Freud's pansexuality something far less simplistic than the first interpretations of his thinking suggested and that the popularizations of his views, in novels and films and plays and self-help books, continue to insist upon. In any case, it seems entirely fair to say, as a French psychiatrist does in paying tribute to Freud's "empirical genius," that he "recognized values in themselves as being beyond the reach of psychoanalytic investigation, and since he himself had not the necessary philosophical training, he left open a dialogue which is doubtless even now far from having reached its true dimensions." [2]

The dimensions of the psychological dialogue may be some distance from their "true" apogee. They are already impressive enough, however, to have begun to discourage the parlor psychoanalyst who traces every phenomenon of behavior, no matter how trivial, to its highly significant traumatic source. Witness, for example, this delightfully ironic passage from *The Changing Nature of Man,* the brilliant "Introduction to a Historical Psychology" by the Dutch psychiatrist J. H. Van den Berg:

Everything has a meaning. When, before Breuer and Freud, if a man moved his leg up and down while he was talking to his wife,

and an onlooker asked what the meaning of this leg movement could be, no one would have taken the question seriously. The movement was something that just happened. We have different ideas now. Not much imagination is needed to suspect that the man with the moving leg has a grudge against his wife; he is kicking her out of the room, even if he reduces his kicks to very modest, and, to the uninitiated (are there any left?), innocent dimensions. If a person today finds delight in sucking his pipe long after the tobacco in it has gone out, it is clear even to a layman that he never really left his mother's breast, he is still sucking the nipple. Or rather, he did not suck it enough then, and it is still bothering him; he made the frustrated desire submerge because it was too disagreeable, and it is coming to the surface when he gnaws his pipe, when he lets saliva run into it and then sucks it back. In the past the question whether this sucking and gnawing might have a meaning was simply never raised. Everyone had his peculiarities, and that was all there was to it. If someone then happened to be visually inclined, no one would have wondered why; now it is quite apparent that he is out to see something else in the things over which his eyes so eagerly rove—his mother, for example, who never, in his youth, appeared naked before him.[3]

Van den Berg's footnote comment on "peculiarities" translates his ironies into an almost bitter reflection:

Nowadays every peculiarity is a symptom, and what is more, a symptom one should get rid of as soon as possible. In principle one can always get rid of it. One way to get rid of it is psychiatric treatment; and thus treatment is recommended for perfectly healthy and sane people. Apparently our ideal is to make every person alike. That this conception harms every person who has a nature of his own—ultimately, that is, every one of us—needs no explanation.[4]

What particularly enrages Van den Berg is the predilection of many a psychologist for the past of his patients: "Starting with the postulation of unchangeability," he "prefers to locate the adventures of life in a far past, so that he can describe life as a 'development,' as an unfolding of endowed potentialities." But

fortunately this is only one kind of psychologist, a somewhat simple-minded kind of determinist who once dominated his field but no longer has it all to himself. There are now many men of Van den Berg's sensibility who understand that life is not a constant stirring of past events, that rather it "deals with what is coming," that "it looks into the future and is curious." [5] And not only do they understand this, they welcome it. They revel in man's free will. They want to free their patients to make bold and open decisions, and not simply by reliving their past, especially not if that means reliving in all its excruciating detail the suffering of the past.

One group of modern psychologists, at least, has moved far from the rigid system that sees man as fixed in his emotions, fixed in his appetites, fixed in his values. Rather than that willless creature, these psychologists evoke in their speculations a being who can make choices, a being who does make choices, and whose primary choice is to love. The world within man, they have discovered, is a world of love. It may be love frustrated, love perverted, love defective, or love excessive. But it is love. The triumphant achievement of much of psychology in our time —and of anthropology and sociology and many other disciplines of learning as well—is to have made this abundantly and eloquently and transparently clear.

14

the act of love

ONE of the daring transformations of our time is of this phrase, *the act of love.* In twentieth-century parlance, until very recently, it could mean only one thing, the sexual act of love. Now to many students of the human person—to psychologists, sociologists, and anthropologists—it has come to mean again what it has always meant to Christians. Or rather, the term has been expanded to encompass every act, internal or external, which deliberately and voluntarily expresses love. It is, furthermore, acknowledged as a rational procedure by which man may come to know more of the mystery of himself and of his universe and of God, though by means that transcend the ordinary modes of knowing. "It is the knowledge," Erich Fromm writes, "that we shall never 'grasp' the secret of man and of the universe, but that we can know, nevertheless, in the act of love. Psychology as a science has its limitations, and, as the logical consequence of theology is mysticism, so the ultimate consequence of psychology is love." [1]

In pursuit of the kind of knowledge which is love, men who work in what might be called the personal sciences, the sciences of man, have plunged deep into the world of sign and symbol,

image and metaphor, which is the inner world of man. They have done so sometimes in pursuit of archetypes, convinced, as for example Jung and his followers have been, that a set of original patterns exists, model myths and symbols and signs, locked away in a kind of vast collective unconscious, upon which man draws in different amounts and different forms at different times. At other times, the search has been for a kind of fundamental ground in which all of man's religious life—Eastern and Western, ancient and medieval and modern—may be said to have its roots and to seek its nourishment. Some people may be disturbed by the apparent nostalgia of Mircea Eliade, the historian of religion, for the myth-centered, ritual-structured life of primitive man:

> To primitive man, every level of reality is so completely open to him that the emotion he felt at merely *seeing* anything as magnificent as the starry sky would have been as strong as the most "intimist" personal experience felt by a modern. For, thanks chiefly to his symbols, the *real existence* of primitive man was not the broken and alienated existence lived by civilized man to-day.[2]

Others may be made uncomfortable by what seems to be an attempt to create a syncretism, reconciling all the leading religious systems of the world, in such a work as Frithjof Schuon's *The Transcendent Unity of Religions,* though he himself specifically repudiates that aim:

> If the expression 'transcendent unity' is used, it means that the unity of the traditional forms, whether they are religious or supra-religious in their nature, must be realized in a purely inward and spiritual way and without prejudice to any particular form. The antagonisms between these forms no more affect the one universal Truth than the antagonisms between opposing colours affect the transmission of the one uncoloured light. . . . Just as every colour, by its negation of darkness and its affirmation of light, provides the possibility of discovering the ray which makes it visible and of tracing this ray back

to its luminous source, so all forms, all symbols, all religions, all dogmas, by their negation of error and their affirmation of Truth, make it possible to follow the ray of Revelation, which is none other than the ray of the Intellect, back as far as its Divine Source.[3]

What all must realize, however, no matter how put off they may be by the apparent biases and real enough tendencies of these men, is that their work is of incomparable service to religion and to the religious, to all men, really. For all men live in a world of forms, symbols, signs, images. And all men should, sooner or later, be willing to submit this world, their inner world, to the kind of radical examination which men like Eliade and Schuon make of it. For it is radical in the deepest and best sense of the word—it gets down to fundamentals, to man's roots. And what it finds there, at the source, are not the scraps and waste, not the carrion flesh which a superficial psychology and an impoverished anthropology once saw at man's center, but the luminous composite of body and soul, the human person, which bears the image of God and constantly reflects that likeness in its mysterious symbols and signs.

This sort of comparative religion is a far cry from that crusading brand which once examined fertility rites and sky gods and the myths of primitive man only to show that God was made in the image of man, and worse, was constructed out of the leavings of some of man's shabbier fictions. What underlies the work of these men, though not always openly acknowledged, is the same compassionate urge to enlarge man's vision and to expand his resources to meet that vision which motivates the Scripture scholars who in our time have worked with such distinction to restore the sacred text to its proper place at the center of our religious experience.

The work of restoration has been accomplished by an extraordinary series of consultations with men usually considered of

the past, the Fathers of the Church, the men who knew best the commanding importance of Scripture in the early years of Christianity. The Fathers, we now realize very well, are not dead men, not really men of the past at all, but rather men of a continuing present, with great resources of wisdom still waiting to be tapped. The constant re-examination of Scripture by scholars of all faiths and of none, the constant enrichment of Scripture examined in the light of the glosses and commentaries of the Fathers is proof enough of the Fathers' incomparable vitality. But it is not Scripture alone that comes alive under the charismatic gaze of Origen and Clement of Alexandria, of Ambrose and Augustine and John Chrysostom and their contemporaries and successors. It is all human experience, at its best and at its worst. Like Gregory the Great in his commentary on the Book of Job, they find the commonplace events of life on earth something over which to wonder and every natural phenomenon worthy of awe. Like Boethius in *The Consolation of Philosophy*, examining the meaning of the doctrine of Providence while he sits in prison awaiting execution, their every concern is to show the continuing reality of Providence even in the midst of the worst natural catastrophes, the horror of war, the terror of the barbarian invader, the misery of earthquake or hurricane or volcanic eruption. Thus they turn doctrine into life and life into love.

The force of this interpretation is to see religion not as something entirely different from ordinary experience but rather as a deepening and intensification of it. The findings of the scholars of comparative religion and the sciences of man, far from attenuating faith or diminishing hope, augment both. For they increase human resources for love. They draw man closer and closer to the divine, by recognizing the realm of mystery which is all around man and deep down inside him and by showing

reverence for it. Never before has there been such an effort on the part of scholars in all the disciplines of learning to probe religious experience, to test its meaning and its usefulness in every field, at every level of life, including, farfetched as it may seem, the possible application of prayer to the growth of plants.

Some scientists of the East have begun to examine their own religious traditions, looking to find through them a richer understanding of both theoretical and experimental scientific procedures. Theologians of the West have turned to the same sources to learn more of the meditative habits of the Orient and to see what fuller religious experience may lie in the adaptation of specific religious exercises of the East, such as those of Yoga, to the practice of Christianity. Eastern philosophers have begun to examine at length and in great depth the mystics of the West to learn more not only of Christianity but of the whole fertile ground of religious experience.

An atmosphere of openness and an attitude of receptivity seem at last to have begun to replace the indifference or downright hostility with which East and West for so long regarded each other's cultures and convictions. How can one help being hopeful, then, even in the face of violent political divisions and the terrible menace of nuclear warfare? Doom threatens on one side. On many others whole new worlds of knowledge and love open up before us. The magnificent words of the forty-third chapter of Isaiah seem more relevant now than ever before: "Behold I do new things, and now they shall spring forth, verily you shall know them: I will make a way in the wilderness, and rivers in the desert."

conclusion

EVERY age has its identifying vices and virtues. The vices are quickly recognized. The virtues take longer to discover. In fact, it is often true that the virtues of an age do not reveal themselves until long after the age has passed. And so it may be with ours.

We are full of our failures. Many of us chastise ourselves with all the regularity and the fervor of Old Testament prophets. We are horrified at our own failure of nerve, sickened by the moral degradation of one generation after another, in politics, in business, in the entertainment world. We look back at the hedonistic pretensions of the world between the wars, which spoke of bringing everyone not only the necessities but every luxury as well, and we find them a clumsy caricature of both ambition and hope. We see ourselves, we think, with realism, the pretensions now finally stripped away, the failures exposed. This is what we are—mediocre, materialistic, neurotic—and we must face it.

But this is not what we are. This is only, to use that much abused word of advertising men and television commentators, our image of what we are, our current image. Our misfortunes

with older images should at least have taught us to be cautious about the new ones, to distrust all formulas that pretend to sum up being in a few crunchy phrases. If there is one thing we should know about ourselves by now, it is that we do not know ourselves, and all the facile making of phrases by the analysts and the categorizers should not persuade us otherwise. We are not as good as we thought we were and we are not as bad as we think we are. But just precisely what we are, we are not able to say. We are not permitted precisions about any being, least of all our own. We are a mystery.

We are, though visible to the naked eye, at least as elusive as atoms. For, as we have begun to learn about the lower orders of animals and plants, what is open to the eye is not necessarily clear to the mind. We stand, we know, at a great distance from the ancient world. Our descriptions of the natural world are far more reliable than theirs. We have better measuring tools. We have a deeper sense of the range of life below the measurable surface, of energies that can only be reached by mathematical conjecture and computation. We have not only begun to design machines that can think for us—at least to the extent that computation is a kind of thought—we have begun to synthesize life. Ectogenesis, the development of life in a foetus outside a mother's womb, is an accomplished fact, though the development is as yet unwholesome in almost every way and hence happily short-lived. Parthenogenesis, the development of life in an unfertilized ovum, is quite within the grasp of biologists, however much this may affront our taste and our theology. Nothing—nobody—can stop these developments any more than any thing or person could halt the progress of atomic science to the point where first fission and then fusion were possible, with all the accompanying horror of the bombs at Hiroshima and Nagasaki and the subsequent tests and tensions.

The scientist cannot help but go on with his work, wherever it carries him. Old errors only breed new truths, as the physicist David Bohm suggests in his brilliant statement of a more or less classical philosophy of nature, *Causality and Chance in Modern Physics:* "For as science progresses, we find that the process of uncovering the errors in previous theories continually points towards the existence of more and more new kinds of things, which were not significant in contexts and conditions studied up to a certain point in the development of our researches, but which may be of crucial importance in new contexts and conditions." [1]

Equally, new truths breed new truths. For no matter how much one learns about anything, "the study of any one thing throws light on other things, and thus eventually leads back to a deeper understanding of its own properties." The very inexhaustibility of the abstractions by which "the totality of matter in the process of becoming . . . can be represented" is the scientist's central challenge. He knows he cannot ever draw off all the possible abstractions or consume all of matter in his definitions. But he knows with what increasing complexity and subtlety and elegance he can construct his abstractions and describe the reciprocal relationships of matter. He has felt the tug of the absolute. "The essential character of scientific research," Bohm concludes, "is, then, that it moves towards the absolute by studying the relative, in its inexhaustible multiplicity and diversity." [2]

One can still reduce human activity to physicochemical processes, if one wishes, but what a vast amount of being and becoming is thus left unaccounted for! Such a mechanistic explanation leaves art alone, really, and the richest, most purposeful speculations of the mind, particularly those which are involved in trying to account for human activity. A merely verbal explana-

tion will not do either: simply to call the great thrusts of man toward purpose and structure and the arts of civilization "the life force" is only, obviously, to give a name to the question but not to answer it. For most scientists, too, the verbal machinery of metaphysics is no more satisfactory than the application of tags like "the life force" to deal with the difficulties of explaining biological organization in man or at any other level of life. Explanation, if explanation can come at all, must come from the general area of experimentation and speculation and demonstrable fact that the scientist regards as trustworthy. That area is large enough to include every scientific or parascientific discipline and liberal enough not to preclude any of the kinds of investigation that at one time were thought to be strictly within the province of the philosopher. The biologist Edmund W. Sinnott describes the terrain with characteristic simplicity and strength of conviction (and with the aid of a similarly gifted colleague), in *Cell and Psyche: The Biology of Purpose:*

Perhaps a further study of bioelectrical fields will give a clue. Atomic physics, far as it now seems from biology, may help by the development of principles like that of Pauli, which already seem to have a bearing on the problem of organization; or that of Heisenberg on indeterminacy, which affects the whole question of freedom. Even telepathy and similar ideas should not be brushed aside as impossible, for they may well turn out to be significant for biology, as an eminent British zoologist, Professor A. C. Hardy, has recently maintained. It is of the utmost importance to keep our minds open to suggestions from any quarter, however unpromising. Our program must be to push out vigorously across the frontier of the unknown everywhere and to explore that region where life, matter, and energy so mysteriously are joined. Surely science has a vast deal more to learn than now it knows. It will discover not only new facts but new concepts, new paths to understanding. "We fool ourselves," writes Hardy, "if we imagine that our present ideas about life and evolution are more

than a tiny fraction of the truth yet to be discovered in the almost endless years ahead."

The plain fact is that in the present status of science biological organization remains still unexplained, and that many investigators are doubtful whether we are nearer to the ultimate answer than we were half a century ago. The problem may be fruitfully attacked in the laboratory by objective, experimental study of the regulation of form and function in plants and animals, bringing to this task all the resources which science has placed at our command. This is the highest goal of biology. When it is attained I believe we shall find that organization depends neither on the operation of only those physical laws which we now know nor on some superphysical or vitalistic agent about which nothing can be learned, but that a more perfect knowledge of nature and man will tell us how the physical and the spiritual are linked in that ascending, questing, creative system which is life.[3]

One may question the likelihood of ever reaching the end of this problem or that it is actually a problem at all, but one must respect the force in scientists like Sinnott which insists that life is the "final problem" and that it can be solved, especially when one sees, as one must, such respect for the fullness of life, spiritual as well as physical. "The biochemist can tell us much about protoplasmic organization," Sinnott says, "but so can the artist. Life is the business of the poet as well as of the physiologist." And so Sinnott is certain that "when the verdict is finally rendered" the record of life "will prove to be the work not only of the biologists in laboratories but of those others who call themselves poets and artists, philosophers and men of faith, who yet all seek the same Promethean flame kindled in organized protoplasm of the humblest cell but rising thence to illuminate the world." [4]

The far reach of what Sinnott calls his "aggressive idealism" should be instructive, at least, to "poets and artists, philosophers and men of faith," and perhaps even inspiring. It comes as the

most significant of reminders that knowledge—at least knowledge of the dimension with which we are here concerned—can no longer be sought with such confidence within the confines of traditional methods or of traditional disciplines. No one way is The Way, not even the exalted way of the theologian. Each of the methods, each of the disciplines, each of the ways is ancillary to the others. Even the queen of the sciences, to give theology its ancient title, serves the others some of the time today. For the graces of insight and intuition have been so liberally bestowed in our time, that revelation, in a manner of speaking, may come at any time and to any man. It is not the revelation that makes religious doctrine, but it is the revelation that applies it. It is not the revelation that delivers faith, but it is the revelation that justifies it. For what one finds in the works of physicists and biologists and philosophers of science of this sort is the most striking celebration of creation, a celebration in which the greatness of the Creator is at least implicit, if not explicit.

In a time when so many have been beset by shattering self-doubt and filled with a sense of failure, it is vitally important to remember these things. Men may have failed. Things have not. The universe is a success, as St. Augustine suggested a few ages ago:

> Ask the loveliness of the earth, ask the loveliness of the sea, ask the loveliness of the wide airy spaces, ask the loveliness of the sky, ask the order of the stars, ask the sun making the day light with its beams, ask the moon tempering the darkness of the night that follows, ask the living things which moye in the waters, which tarry on the land, which fly in the air; ask the souls that are hidden, the bodies that are perceptive; the visible things which must be governed, the invisible things which govern—ask all these lovely things, and they will answer thee, lo, see we are lovely. Their loveliness is their confession. And these lovely but mutable things, who has made them, save Beauty immutable? [5]

These wise words sound like a chorus of scientists and artists singing the works of their days: Adolf Portmann calling attention to the marvels of animal creation: Agnes Arber pointing to the great nexus of fact and fantasy which plants are: Werner Heisenberg and Max Born and Niels Bohr and Louis de Broglie and David Bohm trumpeting the meaning for human behavior of what has been learned of atomic behavior: Georges Seurat proclaiming the majesty of the dot, Paul Cézanne the central significance of cones and cylinders and cubes and spheres, Vincent Van Gogh the mute lament of a chair, Piet Mondrian the logic of a line, and dozens of their successors crying the endless power to move one and to elicit art of colors, textures, and objects, however clearly or mistily reproduced: Erich Fromm insisting on love as the central concern of psychology: Frithjof Schuon discovering the power of universal truth to break down antagonisms across the world.

Musicians, sculptors, poets have responded in the same way to the presence of things. Their works are abstractions, but their works of art, almost as clamorously as the drama, which shuns the abstract, summon the concrete. In their unitary approach to creation, they do not bring back just one particular moment in their lives for us somehow to relive in ours. They give us, again and again, all the particular moments in all our lives, filled with all the things that are all around us, that we can touch and taste and see and hear and smell. Fifteen hundred years ago St. Augustine said, "Ask the loveliness of the earth, ask the loveliness of the sea, ask the loveliness of the wide airy spaces . . ." Just a few years ago, Louis MacNeice said:

> World is crazier and more of it than we think,
> Incorrigibly plural. I peel and portion
> A tangerine and spit the pips and feel
> The drunkenness of things being various.[6]

Things being various . . . things being. . . . That is the special perception of our time. Once enchanted with matter because of the comforts, the luxuries, the passive joys it could bring, many men passed from enchantment to tyranny. Matter passed from a passive agent to a ruling instrument. Those who surrendered to matter surrendered everything to it—their power, their wisdom, their glory. Materialism commanded them. They became so engrossed in the ways of matter and in their relationship with it, that they lost both themselves and matter. They lost their sense of being. Now many are beginning to recapture matter and with it their own sense of being. Seeing things for what they are, they may even be able in time to see themselves for what they are. They may be able to use the things of this world, as surely they were intended to be used, as mediators between themselves and God.

What we learn this way is not exactly new. The writers of Scripture and the Fathers of the Church and all who followed their wise example knew this to be the meaning of things: They knew that theirs was a signifying world. They depended on it. The heavens showed forth the glory of God and so did the smallest dot or squiggle of creation. There was sense in things, sense in events, sense even in people. Everything had been provided for, everybody had been provided for. But one had to attend very closely, to study very deeply, to understand even the large outlines of the providential ordering of things and people and events. For here below, man's sight was too short and his understanding too blunted to penetrate much into the mystery of being. But enough could be learned so that the world could be used with profit and so that man could come to love it and to love himself and to love Him who made both. And so the Fathers used their learning—such as it was—and their love—and how much it was!—and left the world a legacy which once

again, after a hiatus of some centuries, the world seems to be ready to claim.

How fitting it is that, in the modern Church, Scripture study should be pursued again with some of the intensity of the Fathers and that accompanying that study there should be such a large concern again for the wisdom of the Fathers. Not only in Europe, but in this country too, there is growing recognition of the obvious historical fact that the Fathers came right on the heels of the Apostles, and that therefore they were immediate heirs to the practices and to the vocabulary and to the understanding which the first generation of Christians was given. And so the Fathers are coming into print again, most of their work for the first time in the vernacular languages. They, and the wisest and most generously gifted of their followers for a thousand years, are being made available not only to scholars but to all others who may be interested.

Should one not read this as a sign, a sign of increasing stability in a quaking, quivering, fearfully frightened world? Are not the Fathers' constant assertions of the benevolence and vigilance of Providence, even though so many of them believed that the end of the world was at hand, of more than passing significance for us today? If one follows the direction of patristic thinking, one comes to examine every strain, every creak, every failure in the world, every human collapse, every poor performance by oneself as productive of meaning and guidance—for oneself, for other humans, for the world. And so it may be with modern man's fear of himself and with the progenitor of that fear, his absorption in process to the point where he seems to have lost all sense of purpose. This may be the only way man can be forced back in upon himself and his world. Providence may thus have designed the spirals of process in the modern era: that they

might end in the contemplation of being, in the stability of purpose.

Is this a hopelessly naïve understanding of the modern world? No, but rather a hopefully naïve one, bred of many things, bred of things: Bred of one-celled animals and of many-celled ones, of plants and paintings and musical improvisations; bred of the Fathers of the ancient world and of the scientists of the modern world; bred of the inexhaustible multiplicity and diversity of things; bred of the magnificent cornucopia of being which has been placed in our hands in our time to admire and to meditate upon and perhaps even to understand.

This naïveté has a high sanction. At the conclusion of His discourse at the Last Supper, Jesus said to His apostles, "These things I speak in the world, that they may have my joy filled in themselves." His followers were not *of* the world, as, he explained, "I also am not of the world." But they were *in* the world, where he wanted them: "I pray not that thou shouldst take them out of the world. . . ." And so He prayed to the Father: "As thou hast sent me into the world, I also have sent them into the world." Can Christians ask for more proof that—in every sense of the word—the world is worth going into?

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index

Abstract art: in painting, 14–17, 121, 123–31, 141–8; in music and dance, 17–19, 121, 149–59; in architecture, 19–20, 121, 136–9; in poetry, 21–4, 160–9; in drama, 23–4, 121, 172–3; in sculpture, 121, 123, 132; evaluation of, 141–8; approach to creation in, 198
Adler, Alfred, typology of, 7
Advertising: psychology of, 10; abstract art and, 16, 128; response to science, 146
Age of Anxiety, The, by W. H. Auden, 164
Animal Forms and Patterns, by Adolf Portmann, 84 ff.
Anouilh, Jean, plays of, 175, 177
Appollinaire, Guillaume, 164
Arber, Agnes, on scientific expression, 95–8, 102, 198
Architecture: process in modern, 19–20; abstraction in, 121, 136–9
Arp, Hans, 17, 162
Art: process in, 14 ff.; religious, 119–20, 136–40; romantic movement in, 121–2; reality and, 125–9; sense of the present in, 132–3; sense of presence in, 134–6; object in, 136–40; contemplation of, 142–5; of the concrete, 170–9. *See also* Abstract art
Ash Wednesday, T. S. Eliot poem, 171
Astronomy, modern, 72–4
Auden, W. H.: and rhetorical conventions, 164–5; hope in, 172
Audincourt, church at, 136–7
Augustine, St., on beauty of universe, 197, 198

Bacon, Francis, 51, 54
Balanchine, George, 19
Baudelaire, Charles, 15
Bauhaus school of painting, 16
Beckett, Samuel, 23, 173
Beethoven, Ludwig von, quartets, 22
Berg, Alban, operas of, 152
Bergson, Henri, 25
Berlioz, Hector, 16
Bernanos, Georges, Christian optimism in, 172
Betti, Ugo, plays of, 175, 177
Biology: of spirit, 64; character of biological form, 78 ff.; difficulties of explanation in, 95–8; of purpose, 195–6
Biology of the Spirit, The, by Edmund Sinnott, 64
Boethius, on consolations of philosophy, 190
Bohm, David, on causality and chance, 194, 198
Bohr, Niels, atomic physicist, 62–3, 198
Bonington, Richard Parks, paintings of, 16
Born, Max, physicist, 65–9, 198
Braithwaite, R. B., on scientific exploration, 111
Brecht, Bertolt: dramatic methods of, 23, 24, 173
Broglie, Louis de: on elementary entities, 56–7, 59; on lessons from atomic science, 63, 75, 198
Brooks, James, 129
Buechner, George, operas of, 152
Buytendijk, Dutch psychologist and physiologist, 104

Camus, Albert, philosophy of, 172
Cantos, The, of Ezra Pound, 165
Castle, The, Kafka novel, 41
Causality and Chance in Modern Physics, by David Bohm, 194, 198
Cell and Psyche: The Biology of Purpose, by Edmund Sinnott, 195–6
Cézanne, Paul, and form in painting, 124–5, 130, 198
Chance and Providence, by William G. Pollard, 65
Changing Nature of Man, The, by J. H. Van den Berg, 184
Chardin, Jean, as painter, 16
Claudel, Paul, 157, 172

Communist countries: and scientific revolution, 47–8; scientific exchanges with, 66–7
Complementarity: of language, 61, 63; of various sciences, 62 ff.; of life processes, 64; range and relevance of, 64–8; scientific acceptance of principle of, 70; in macrophysics and microphysics, 75
Composers, musical: procedures of, 15, 16; and abstraction, 150 ff.; of organ music, 156–9
Concerning the Spiritual in Art, by Vasili Kandinsky, 147
Consolation of Philosophy, The, by Boethius, 190
Constable, John, paintings of, 15–16
Cosmology, modern views on, 70–4
Craft, Robert, and Stravinsky, 18
Cubism, 17, 128
"Cultural divide," between scientists and nonscientists, 45–8
Cummings, e. e., 164

Dadaism, 160–3, 164, 170, 171
Dalcq, Albert M., embryologist, 78
Dance: rhythms and styles of modern, 17–19; abstraction in, 121
Dante Alighieri, 22, 30, 166, 167
Debussy, Claude: musical impressionism of, 15, 150, 157
De Feo, J., cited, 136
Degas, Edgar, impressionism of, 15
De Kooning, Willem: paintings of, 141; on response to science, 145–6
Derain, André, and use of color, 16
Desmessieux, Jeanne, organ compositions of, 156
De Stijl, Dutch school of painting, 20, 128, 146
Determinism: mechanical, 58–9; language of, 61; rejection by scientists, 70, 75; as view of reality, 74–6; of Freud, 183
Diaghilev, Sergei, 17
Doctor Zhivago, Pasternak novel, 172
Doesburg, Theo van, art of, 146
Donne, John, influence on T. S. Eliot, 22
Drama: process in, 23–4; abstraction in, 121, 172–3; spirituality in modern, 173–7
Duchamp, Marcel, paintings of, 162
Dufy, Raoul, and color in painting, 16
Duparc, Henri, musical impressionist, 15
Dupré, Marcel, organ compositions of, 156, 157

Eastern philosophy, x, 101, 102, 190
Einstein, 74, 75
Eliade, Mircea, on primitive man, 188, 189
Eliot, T. S.: and process in poetry, 21, 22; influences on, 166–8; hope in, 172
Éluard, Paul, and Messiaen, 157
Evaluation of abstract art, 141–8
Existentialism, 13, 132–5
Experiment and Theory in Physics, by Max Born, 68
Expressionism: German, in painting, 16, 18, 23, 24, 126, 128; in drama, 23, 24

Falcinelli, Rolande, organist, 156–7
Fall, The, Camus novel, 172
Fathers of the Church, xi, 190, 199–200
Fauré, Gabriel, 15
Fauvist painters, 128, 138
Finnegans Wake, by James Joyce, 30, 31, 164, 170
Form: sense of, 78–81; in biology, 78; aspects of organic, 79 ff., 147; man-made, 80–1; importance of surfaces, 103; in painting, 124–5, 130, 198; in abstract art, 123, 147
Four Quartets, by T. S. Eliot, 22
Franck, César, organ music of, 157
Freud, Sigmund, 6, 7, 182–4
Fromm, Erich, 184, 187, 198

Gauguin, Paul, and color, 16
Genet, Jean, dramatic methods of, 23
German expressionists in art, 16, 18, 23, 24, 126, 128
Giraudoux, Jean, plays of, 173, 177
Goethe on Nature and on Science, by Sir Charles Sherrington, 82–3
Gogh, Vincent van: technique of, 16, 130; and reality, 126–7, 198
Gottlieb, Adolph, cited, 129

Grammar of Assent, by Cardinal Newman, 98–100
Graves, Morris, paintings of, 141
Gregory, F. G., on form in plants, 79
Gregory the Great, St., on the commonplace, 190

Hahn, Reynaldo, impressionism of, 15
Hallahan, Mother Margaret, 99
Haller, Swiss biologist, 95
Hauptmann, Gerhart, dramatic procedures of, 23, 24
Heisenberg, Werner, and scientific indeterminism, 59–61, 66–7
Herter, Christian, on relations with Communist world, 66–7
Hindemith, Paul, musical style of, 150
Huis-Clos, Sartre play, 24
Humphreys-Owen, S. P. F., physicist, 79
Huxley, Julian, 114–15

Ibsen, Henrik: and modern theater, 23, 24; and James Joyce, 31; his dramas of the spirit, 173, 177
Illative sense, and science, 98–101
Impressionism, in music and painting, 14 ff., 123–8, 154
Indeterminism: as view of reality, 74–6; in science, 59, 60, 66–7; in art, 145
Interpretation of Dreams, by Sigmund Freud, 183
Ionescu, Eugene, dramatic methods of, 23

Jacob's Room, Virginia Woolf novel, 32
Jaspers, Karl, on modern man, 3, 4
Jordan, Pascual, quantum physicist, 63–4
Joseph and His Brothers, by Thomas Mann, 28–9
Joyce, James: philosophy expressed in novels of, 29–31, 171; his verbal expression, 164
Jung, Carl Gustav, psychological theories of, 7, 188

Kafka, Franz, philosophy of, 34–42
Kaiser, Georg, and stage production methods, 23
Kandinsky, Vasili: abstract painting of, 128; influence of science on, 147
Kierkegaard, Soren, 130
Klee, Paul, 16, 128
Kline, Franz, on philosophy of art, 130

Language: of science, 49, 59–61, 95–8, 102, 198; complementarity of, 67; verbal abstraction, 160–70
Laplace, Pierre Simon, French astronomer and mathematician, 111
Lavelle, Louis, 132
Lawrence, D. H., 172
Le Corbusier (Charles Edouard Jeanneret), his chapel at Ronchamp, 137–8
Léger, Fernand, religious art of, 136–7
Lindsay, Vachel, 164
Lorca, García: and process in poetry, 21; plays of, 174, 177
Lytle, Richard, and process in painting, 131

MacNeice, Louis, on variety, 198
Macroscopic world: and the scientist, 55–8, 63; determinism in, 75
Magic Mountain, The, by Thomas Mann, 26–8
Mallarmé, Stéphane, 21
Manessier, Alfred, 139–40
Manet, Edouard, 15
Mann, Thomas, philosophy of, 26–7
Marcel, Gabriel: on sense of the present, 132, 133; on sense of presence, 134–5
Materialism: scientific, of 19th century, 52–4, 69, 70; dialectical, 66
Matisse, Henri: and color, 16; religious art of, 136, 137
Mauriac, François, 172
Messiaen, Olivier, 156–9
Metaphysical Journal, of Gabriel Marcel, 133, 134–5
Metaphysics: as a philosophical discipline, 12; verbal machinery of, 195
Microscopic world: and the scientist, 55–8, 63; and determinism, 75

Mind and the Eye, by Agnes Arber, 95–8
Minkowski, Hermann, astronomer, cited, 74
Moholy-Nagy, Ladislaus, 131
Mondrian, Piet, 17, 128, 198
Monet, Claude, impressionism of, 15, 123
Montale, Eugenio, and process in poetry, 21
Montherlant, Henry de, 176–7
Moore, Marianne, and process in poetry, 21
Morphology, 82–3, 103, 147
Motherwell, Robert, on judgment of modern painting, 130
Mrs. Dalloway, by Virginia Woolf, 32
Music: process in, 14, 17–19; influence on poetry, 22; abstraction in, 121, 149 ff.; romantic movement in, 149; modern religious, 155, 156–8

Nature: man's attitude to, 45 ff.; realities of, 48–9; contemplation of, 49, 84 ff.; scientist and, 49; form in, 78 ff.; and mystery, 106; and primary revelation, 109
Neumann, John von, cited, 58, 59
Newman, John Henry Cardinal, on illative sense, 98–100
Newton, Isaac, 60, 99
Nolde, Emil, German expressionist painter, 128

Object in art: reality of, 125–9; philosophy of, 129–32; religious, 136–40
Opera, modern, 152–3
Organic forms, 79 ff., 147

Painting: process in, 14–17; impressionism in, 14 ff., 123–8, 154; expressionism in, 16, 18, 23, 24, 126, 128; romantic movement, 121; abstraction in, 121, 123–31, 141–8
Pascal, Blaise, ix, 5, 51, 54, 55
Pasternak, Boris, 172
Pensées, of Pascal, ix
Philosophy: modern study of, 12–13; of modern novelists, 25 ff.; of science, 62 ff.; Eastern, 101, 102, 190; of art, 129–40
Physics, 51, 55, 57–8; language of, 59; connection with other sciences, 62–4; various branches of, 62 ff.; causality and chance in, 194
Picabia, Francis, paintings of, 162
Picasso, Pablo, styles of, 16, 17, 154
Pirandello, Luigi, 23, 24
Pissarro, Camille, impressionism of, 15
Plague, The, novel by Camus, 172
Planck, Max, physicist, 60, 69
Poetry: process in, 21 ff.; abstraction in, 121, 160–9
Pollard, William G., physicist, 65
Portmann, Adolf, on animal forms, 84 ff., 103–4, 105–7, 198
Post impressionism, in painting, 123 ff.
Pound, Ezra: and process in poetry, 22, 164, 168; on modern poetry, 168–9
Poussin, Nicolas, 16
Process: modern obsession with, xi, 12–19; in the arts, 14 ff., 131; in the novel, 25 ff.; in science, 102–4
Proust, Marcel, philosophy of, 25–6
Psychoanalysis, ix, x, 6–9, 182–3
Psychology, modern, ix, x, 6, 7, 10, 181 ff.
Psychopathology of Everyday Life, by Sigmund Freud, 183

Rank, Otto, 7
Rauschenberg, Robert, cited, 131
Realism: in drama, 24; in art, 125–9
Reality, and art, 125–9, 198
Relativity, theory of, 74, 75
Religion: and science, 107–16; religious art, 119–20, 136–40; and primitive man, 188, 189; syncretism, 188; and symbols, 189; modern studies of, 189–91
Renaissance humanism, 81
Renoir, Pierre Auguste, paintings of, 15, 123
Rimsky-Korsakov, Nicolai, 17
Romantic movement: in art, 121–2; in music, 149
Ronchamp, chapel at, 137–8
Rouault, Georges, 16, 138–9

Russia: and scientific revolution, 47; scientific exchange with, 66–7

Sartre, Jean Paul, drama of, 24
Scheler, Max, cited, 144–5
Schoenberg, Arnold, and reality in music, 151, 152, 153
Schrodinger, Erwin, physicist, 62
Schuon, Frithjof, cited, 188–9, 198
Schweitzer, Albert, 48
Schwitters, Kurt: sound poems of, 160–1; sensitivity as painter, 162
Sciama, D. W., cosmologist, 70, 71, 72
Science: cultural divide between scientist and nonscientist, 45–8; and nature, 48–9; role of scientist, 49–55; language of, 49, 59–61, 95–8; and materialism, 52–4, 69, 70; inductive method of, 55; limitations of scientific knowledge, 68–74; procedures of, 76; and religion, 107–16
Scott, Sir Walter, on instinctive apprehension, 99–100
Scripture, modern study of, 189–90, 191–200
Sculpture: abstraction in, 121, 123; sense of presence in, 132
Seurat, Georges, paintings of, 15, 123–4, 130, 139, 198
Shaw, George Bernard, 23, 24, 174, 177
Sherrington, Sir Charles, 82–3, 110
Sinnott, Edmund: on biology of spirit, 64; on biology of purpose, 195–6
Snow, C. P., cited, 46–8
Sociology, modern, 9–12
Stankiewicz, Richard, cited, 132
Stein, Gertrude, verbal experiments of, 164, 171
Stevens, Wallace, cited, 21
Still, Clyfford, cited, 130
Stravinsky, Igor: varying styles of, 17–18, 19, 150, 154–6; on Von Webern, 153–4; religious compositions, 154–6
Strindberg, August, 23, 24, 173
Surrealists, psychoanalytical paintings of, 147
Symbolism in French poetry, 21

Tchaikovsky, Piotr Ilich, 18
Teilhard de Chardin, Pierre, 114–16
Theater. *See* Drama
Theology: and science, 52; and religious traditions, 191
Thomas Aquinas, St., 30, 72
Time: Bergson's concept of, 25; and novels of Proust, 25–6; and Thomas Mann, 26–7
Toller, Ernst, and methods of stage production, 23
Tomlin, Bradley Walker, cited, 134
Transcendent Unity of Religions, The, by Frithjof Schuon, 188–9
Trial, The, by Franz Kafka, 34 ff.
Turner, J. M. W., paintings of, 15, 16
Tzara, Tristan, Dada poet, 162

Ulysses, by James Joyce, 30
Undeveloped areas, and science, 47–8
Utopia, The, by Thomas More, ix

Valéry, Paul: and process in poetry, 21, 22, 171; obscurity of, 165–6
Van den Berg, J. H., on nature of man, 184–5
Vence, Matisse chapel at, 137
Verlaine, Paul, 15
Vico, Giambattista, and James Joyce, 31
Vlaminck, Maurice de, 16

Waddington, C. H., on aspects of form, 78, 79–80
Wagner, Richard, 16
Wasteland, The, poem by T. S. Eliot, 171
Waves, The, by Virginia Woolf, 33
Webern, Anton von, musical style of, 18, 153–4, 155
Weizäcker, C. F. von, 60, 61
Wigman, Mary, ballet of, 19
Woolf, Virginia, 31–4

Yeats, William Butler: and process in poetry, 21, 22, 171; obscurity of, 165
Yesenin, Sergei, 21
Yoga, and Christianity, 191

Zen Buddhism, 101, 102

(*continued from front flap*)

the struggles of individual writers, poets and other artists (especially those of the abstract) to strip their art to its inner essentials. They are shown as special examples of an inspired way of dealing with the tortures of a process-haunted world, and as having replaced by a deep-seated sense of purpose that excessive concern with the way things are done which the author diagnoses as one of the central ills of our time.

To the work of modern scientists and artists, Barry Ulanov adds the contributions of scholars working in the sciences of man (psychologists, anthropologists), and students of Scripture and of religion. In all these achievements he finds a respect for being, a reverence before mystery, an atmosphere of hope. Hence his conclusion that "the modern world not only provides us with occasions of hope, it is in itself worthy of our hope" and that "whole new worlds of knowledge and love open up before us."

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